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CHANGING BACKGROUNDS IN RELIGION AND ETHICS

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CHANGING BACKGROUNDS IN RELIGION AND ETHICS

A METAPHYSICAL MEDITATION

BY

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INTRODUCTION

NON ALIA EST PHILOSOPHIA ET ALIA RELIGIO

The single purpose of this reflective study is to express definitely the consequences in ethics and religion of accepting the principle of evolution in philosophy. In the seventeenth century theologians and metaphysicians were divided between two conflicting views of the genesis of truth and goodness and of the ground of the authority they exercise over our intellect and will. Descartes was of the opinion that necessary truths such as those of mathematics, and even logical principles such as the principle of non-contradiction, were dependent on God's will and the result of God's choice; that God, had he so chosen, might have brought it about that judgments which seem to us necessary should not be true, and that judgments which seem to us self-contradictory should be true. The Calvinist theologians expressed the same idea in their doctrine of the sovereignty of God, and it proved a not inconvenient way of silencing the rebellious questionings of those who found it difficult to reconcile the doctrine of election with ethical principles. Leibniz, on the other hand, distinguished between God's intellect and God's will, and also between necessary and contingent truths. The necessary truths are independent of God's will in the sense that they arose as ideas in God's mind, products of his intellect, the expression of the divine activity itself. Contingent truths depend on God's will, his perfect wisdom being shown in the choice of the best possible among infinite possibilities.

The problem was never solved. Before it could be

16199

solved the progress of thought and the changing background of science had robbed it of all meaning. The most superficial survey of contemporary thought will show how completely different are the problems of truth and goodness in our modern world. Between the speculative activity of the seventeenth century, with its theistic metaphysics and its metaphysical theology, and the experimental activity of our present age, with its scientific metaphysics and its metaphysical science, there has intervened an age of deistic ethics, materialistic science and positivistic philosophy. Twentieth-century science is not materialism. It has been described as an idealistic reaction. If, however, modern science is almost consciously idealist in its direction it is able to be so because idealism in philosophy has completely thrown off its theological garments.

The problem of religion and ethics in modern thought is not, as I conceive it, to harmonise natural science with the old religious concepts, but to reform our concept of God in accordance with our progress in interpreting our knowledge of the physical world. It is not: How can I frame an image of God? for we know that it is impossible to fashion an image of what is pure spirit; it is: How am I to conceive God seeing that a concept of God is a necessity of thought. Also, there is no escape from our moral obligation to live the good life. It is not open to us, as some philosophers of last century thought, to inquire first whether life is or is not worth living, and then act in accordance with our judgment of its value. It is true that we bring nothing into the world and carry nothing out, yet our life is a heritage of the past and we are guardians of that heritage for the future.

CONTENTS

PAGE

INTRODUCTION 5

CHAPTER I

THE LIVING AND THE INERT 11

CHAPTER II

THE COSMOLOGICAL THEORIES 21

CHAPTER III

THE DESCENT OF MATTER AND THE ASCENT OF LIFE 32

CHAPTER IV

INDIVIDUALITY AND CONTINUITY 50

CHAPTER V

THE GOD OF PHILOSOPHERS 71

CHAPTER VI

EVOLUTION AND THE MORAL LAW 89

CHAPTER VII

LIFE AND KNOWLEDGE 109

CHAPTER VIII

THE IDEAL OF DISINTERESTED KNOWLEDGE 130

CHAPTER IX

PAGE

PERSONALITY AND THE PROBLEM OF SURVIVAL . . . 156

CHAPTER X

THE NATURE OF HUMAN FREEDOM 175

CHAPTER XI

THE PROBLEM OF EVIL 196

CHAPTER XII

POETS AND PHILOSOPHERS 211

INDEX 223

CHANGING BACKGROUNDS IN RELIGION AND ETHICS

CHANGING BACKGROUNDS IN RELIGION AND ETHICS

CHAPTER I

THE LIVING AND THE INERT

Par la métaphysique je n'entends pas ces considérations abstraites de quelques propriétés imaginaires dont le principal usage est de fournir à ceux qui veulent disputer de quoi disputer sans fin; j'entends par cette science les vérités générales qui peuvent servir de principes aux sciences particulières.

—MALEBRANCHE.

Descartes, in the second of the *Méditations Métaphysiques,* uses a homely but striking illustration.

> Consider this lump of beeswax. It has just come from the hive and has not yet lost the sweetness of the honey savour and it still keeps something of the fragrance of the flowers from which it was gathered; it has a definite colour, shape and size; it is hard and cold, it can be pressed out of shape, and if it is struck it gives back a dull sound. All those qualities by means of which we recognise an object are in fact discernible in it. But while I am describing it someone takes it near the fire. Its peculiar savour disappears, its odour evaporates, its colour changes, its figure alters, its size increases, it liquefies, it becomes too hot to handle and now if it be struck it will give back no sound. Is it

> then the same beeswax which it was before the change? No one doubts it. Yet one thing and one thing only has remained constant throughout its changes. It has always the same extension.

The doctrine which Descartes designed to illustrate by this example is that the substance of a material object consists in extension alone. Every character or quality which a material object presents to us may change, may become something quite different, or may disappear altogether; we may think of it deprived of its colour, unable to give forth a sound, without taste, or smell, or weight, but if we try to think of it as having no extension we are not thinking of a material object at all. We are not accustomed to think of material objects today quite in this way, because in our ordinary notions of the world we think of space as the place which an object occupies and which continues to exist as a void even though the object which it contains should cease to exist. Descartes, however, meant his illustration of the lump of beeswax to be a proof that there is no space in the meaning of a void or empty place, but only the extension which is the substance of material objects. If this is a real lump of beeswax, he argued, its extension is an essential character it possesses under whatever other conditions it exists. There are not two things: one, space or emptiness; the other, the wax which occupies it, for a material thing without extension is nonsense. If, however, we call the quality of being extended the spatial quality of the thing, then we may say that space is the fundamental condition of material existence.

Bergson, in one of his lectures at the Collège de France, made use of an equally striking and homely

illustration. Pointing to the glass of water and bowl of sugar, which, as is the custom of France, stand beside the lecturer's desk, he called attention to the familiar process of sweetening a glass of water. The matter of interest to me, he said, is not the present state of the objects, but a change which I must effect. For this I must wait until the sugar dissolves. The substantial thing here is not the extension, but the duration. A certain time must elapse, and do what I will to hasten or retard the process, this time abides as its fundamental and essential condition. What is this time? Is it an empty form? Can it be thought of as existing in itself apart from the process? No, because it corresponds to something I live through. The time I have to wait is not mathematical time, which would apply equally well to the entire history of the material world even if that history were spread out instantaneously in space. It coincides with my impatience, that is, with a certain portion of my own duration which I cannot protract or contract as I like.

Material objects and the changes which they undergo may present to me when I reflect upon them either of two aspects. An object may appear to me as primarily dependent on its extension or on its duration. Under its aspect of extension time does not affect it. It does not change. However much its outward form may vary, its spatial stuff is constant and remains in substance identical. Under its aspect of duration change is its essential nature, for the material object is now a process and the direction of the process is irreversible. The one resistant stuff is not space, but time. There is yet a further difference. Space and time are not abstractions or empty forms when they characterise objects and processes. A spatial thing is an object conceived as extended, not an object con-

ceived as occupying space, and a changing thing is an object conceived as enduring, not as succeeding something else in time. All objects to which we attribute changeless extension we conceive as dead things, and all objects which are living objects endure. Living things are material objects which remain identical though continuously changing. The world contains these two quite different kinds of real things, living and dead.

When I meditate on my knowledge of material things my reflection turns naturally and first of all to the thing I know familiarly and most intimately, the thing I call my own self. I do not mean by this self the abstract and elusive pure subject in the knowing relation which philosophers name the transcendental ego, nor do I mean what they distinguish from this as the empirical ego, nor do I mean myself conceived abstractly as immaterial mind or spirit or soul. I mean the self which goes to bed at night and gets up in the morning, which entered on its existence as a puling infant, which has since been jostled about in the daily struggle with its environment, and which will at last come to a dead stop and cease to be. What sort of object am I and what is the essential character which makes me a living thing?

I am a material extended object in a world of extended objects and in many respects I seem to partake of the nature of the lump of beeswax. My life is composed of a succession of states of something, the underlying identity of which appears to be its spatial character, its extension. I am a living thing composed it seems of a mobile, plastic, sensitised material, complex and highly organised. My states appear to resolve themselves into simple repetitions with little variety, and into routine actions. My conscious or sensitive

character makes me seem a passive recipient of the effects on my organism of my experience. My various states occasion pleasure and pain, but these seem incidental only; and the states themselves appear to be no more than the different appearances of the beeswax whose identity is its extension. A fuller and deeper reflection, however, shows me that the substance in which my identity consists is not extension, but duration. I am in fact not like the beeswax at all, but like the dissolving sugar. My continuity depends on time. I change continually and in a direction which is irreversible. I pass from childhood to maturity, and on to old age and death, and in all these changes it is time, not space, which is the insistent reality.

A yet deeper reflection reveals to me that this is only a superficial aspect of my being, for in fact I change integrally at every instant of my life, and there is nothing in me which is changeless. Each new experience as it comes, however trivial it appear, whether it be something I see, or hear, or say, changes my whole being. No experience is adventitious. Nothing is mechanically and artificially imposed on me, added to what was there already. Experience is making me. I cannot unmake myself. To cease to change is to cease to live. I cannot break myself up into states which like the sections of a puzzle-picture can be refitted to reconstitute me. I cannot even recover the state which existed before the last trivial incident in my experience occurred. Time, then, I now see, enters into the reality of myself in a quite different way from that in which it enters into the astronomer's calculations. The astronomer measures backwards and forwards. He can fix any standard he chooses for his time dimension so long as he preserves the order of succession, but for me time is the substance of my being and I endure by

changing. I carry my past in my present, not as one carries a burden he can add to or throw off, but as one who grows and develops by incorporating the material nourishment on which he lives.

I reflect now that, while there are in the world around me living objects like myself, there are also other kinds of objects, the inert or non-living. These form by far the greater portion of my perceptions. The contrast between myself and my world is profound. The non-living world also changes. Every material object in the world is changing and changing continually, but the word change has a different meaning when it refers to the non-living. Inert objects change by disintegration. The process is mechanical and reversible. Material objects are not making and unmaking themselves. They are an aggregation of constituents, and change means that these constituents are undergoing rearrangements and new disposition due to mechanical disturbance.

There is, then, a fundamental difference between material objects which are inert and material objects which are living things. This difference is in the meaning of change in the two cases. Inert things undergo change, but it is external to them. They pass from one state to another and the continuity of their existence depends on extension or space. Living things change, because every state of a living thing is the actual outcome of a process which has produced it. Change in the living thing is not a succession of states, but duration. The identity of the present state of a living object with its past states depends on a time continuity. To endure means to hold the past, to carry it along in the present.

When I consider, then, the concrete objects of my knowledge, the material things which are spatially and

temporally ordered in the world around me, they fall into two groups; inert things whose substantial identity is primarily spatial or space dependent, and living things whose substantial identity is temporal or time dependent. Must I think of these two groups as ultimately different and of the world as consisting of two disparate classes of objects?

It is difficult to think it can really be so, for in the first place all objects, living and non-living, are in spatio-temporal relations to one another; and in the second place this very self-existence, which we know immediately as enduring, has also for us its spatial, material and inert aspect. May it not be that the universe itself is a living thing? May not its materiality be an aspect of its duration, like the states which appear to succeed one another in my reflection on my own experience? Some such reflection must have been in Spinoza's mind when he declared the notion of two substances to be a contradiction and reasoned that there is one substance, God, manifesting itself under its two attributes, thought and extension, though existing in infinite modes. Is the universe a reality which endures, a world which changes not by spatial disposition, but by its actual activity? Does it carry its past in its present and move ever onwards under the urge of its self-creating life?

The first difficulty is that it seems impossible to reconcile such a conception with positive science. *Prima facie* it seems to run counter to the whole direction of scientific interpretation. It is true that physics consists in conceptual construction designed to interpret sensible reality. It is true also that science has not succeeded and may never succeed in bringing the facts of life and mind into a scheme of mechanistic interpretation. Indeed the signal failure of science in

every one of its attempts to do so seems to invite us to reverse the principle and conceive the universe in terms of life rather than in terms of mechanism. There is, however, a formidable difficulty in the way of such a concept.

The whole scheme of the universe as it unfolds itself to our investigation leads irresistibly to the conclusion that living objects are historically later in emerging than the non-living; that they are dependent on very complex physical conditions which occur rarely and are separated by immense distances in space and vast intervals of time; and that these conditions are temporary, destined to disappear and leave the continuance of the existence of living forms impossible. We seem driven to admit, by logical arguments based on empirical observations, that the existence of the inert is antecedent, in the logical as well as the temporal order, to the existence of the living.

When I form for myself the image of the material world as it was before life or mind existed, and as it will be after they shall cease, it is true that I construct this image out of aesthetic material drawn from present and actual experience, yet it leads me to a conception of order and natural law. I do not picture the world before life and mind as a chaos or clash of forces subject to blind chance. Were this my image of the material world there would be no physical science. Chance has no place in science. The images which served for the old creation myth—the earth without form and void, darkness on the face of the deep, the spirit of God moving upon the face of the waters, God saying, let there be light—are not scientific. The world for physical science is continuous. We read its orderly past and anticipate its future in an unbroken

time flow. Physics measures in light-years the expanse of the stellar system, calculates the period since the sun filled with its mass the orbit of Neptune, and the time to come when it will cease to radiate light and heat and shrink within a dark crust. This means that science conceives the universe as an orderly system and as analogous to a living organism, so far at least as its mechanism implies unity and uniformity, but as devoid altogether of the animating principle which in the case of the living organism alone interprets conscious purpose. Science finds no purpose in the cosmos and has no need for an animistic principle even as a hypothesis.

Science sets before itself as its primary aim an ideal of precise description, but no description is self-satisfying. All description invites interpretation. To explain the universe requires metaphysics. It is a philosopher's job. Explanation, however, is not a luxury; it is a demand of man's rational nature. His search for truth is inspired by a principle which assures him that there is a sufficient reason of all existence. Therefore he is not content with observing uniformities, recording measurements and calculating probabilities; he constructs cosmologies. For long ages cosmology was subordinate to theology. It was inferred that the natural world was God's creation. God was conceived as a Spirit, possessed of superhuman wisdom and power, who has formed the heavens and the earth and fashioned them to provide the stage for the drama of human history.

We of the scientific age have lost interest in the theological cosmologies, not alone on the ground of their naive anthropomorphism and anthropocentricism, but because being the reflection of a pre-scientific age they

no longer express our attitude to the world problem nor the form of our rational questions. It is true that the concept of God enters as an important factor into all the modern cosmological schemes, but no longer as an authoritative or transcendent idea. It expresses the universality of the principle of sufficient reason and stands for the justification of the faith of the human mind in reason itself.

CHAPTER II

THE COSMOLOGICAL THEORIES

> Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding. Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it?
>
> —JOB xxxviii. 4, 5.

It is frequently remarked as a subject of surprise and wonder that Copernicus should have put forth his heliocentric hypothesis in his *De Revolutionibus orbium Coelestium* (1543) with such perfect confidence, when as yet no one had beheld the spots on the sun, the markings of the moon, the phases of Venus, the rings of Saturn, or the moons of Jupiter; when in fact no one had, or could have had, the means of empirical demonstration, and when the only appeal could be to mathematics and the geometry of the heavens. Empirical confirmation was long in coming. The telescope was not invented until more than sixty years after Copernicus's death, and when it was invented the invention was heralded as a practical advantage, and the Venetians endeavoured to secure the monopoly of it for their fleet long before it was turned to the service of theoretical science. There is, however, small matter for surprise in the fact that the scientific revolution occurred when it did. Cosmological theories became a necessity of human thought when the discovery of the new world and the circumnavigations of the globe had altered completely man's mental picture of the world. The antipodes was still a paradox, but

however difficult it might be to realise in imagination, it was now clear to demonstration that the antipodean folk experience none of the theoretical inconvenience which seemed bound up in the idea of them. So the Copernican theory was not merely a mathematical advance. It was not the discovery that there was a simpler method of explaining the movement of the heavenly bodies than the cumbersome one of the Ptolemaic epicycles by adopting a heliocentric hypothesis in place of a geocentric one. The fixed earth hypothesis was now offering peculiar difficulties of its own, and it was these difficulties which secured the success of the Copernican revolution. The paradox of the antipodes called for a new scheme of the celestial mechanism, a new world-view.

The first of the cosmological theories of the scientific era is Descartes', and the modern mechanistic conception of the universe starts with his theory. Descartes' theory is attractive in its simplicity. He defined material substance by its essential quality, or attribute, or property—extension. The substance of external reality consists, he said, in extension alone, and the universe, therefore, in the pure conception of it, is fundamentally geometrical. The argument for this identification of space with extension is very important. It involved the rejection of the Epicurean concept of the void which till then had held its place as the type of rationalistic theory and which was still in Descartes' time ably defended by Gassendi. Suppose, Descartes argued, we regard extension not as material substance, but as the void which material substance occupies, then we are confronted with a dilemma. Either there are two extensions to account for, one belonging to the object and the other indifferent to it—and this is absurd, for there is no way of distinguishing space

from extension—or else there is only one extension of a material object, the space it occupies, and when the object moves it must leave its extension behind, which can only mean that it ceases to exist, and this also is absurd. In other words it is absurd to say that an object moves if we mean that its extension is immobile. The world, therefore, in Descartes' view is a plenum; the void is a self-contradiction. In its static aspect, that is, conceived without movement, the material world is an undifferentiated plenum. The variety and manifoldness of the actual universe are due to movement and to nothing else. Movement imparted to, or imported into, extension is sufficient to account for the working of the cosmos and for the activity of all its parts, including those self-regulating organisms, plants and animals, which maintain their form and reproduce their kind. The principle of Descartes' cosmology is based, therefore, on his concept of movement. Movement, he thinks, is indestructible, fixed in quantity, absolutely conserved throughout its transformations. Once introduced into the cosmos it automatically propagates itself, passing from point to point, disappearing in one form to reappear in another. If we assume the existence of the plenum as the condition of the cosmos, then the creative act was the introduction of movement; the rest is automatic. In a plenum the only possible form of movement is the vortex, and the cosmos in its dynamic aspect, the aspect of a universal activity, is a vortex system. Descartes in his *Principles of Philosophy* set himself the task of working out the dynamics of this system. The movement of a material object is not its shift from one absolute position to another, without relation to anything but the emptiness of the vacated position; movement is an alteration or change of the relative positions of every-

thing. The movement of anything is the movement of everything. A particular movement can only be initiated in a plenum if the complete circularity of the movement is involved from the outset, so that the final displacement links itself on to the initial displacement. The whole universe, presenting to the macroscopic view the vast stellar and planetary systems, and to the microscopic view the organised individuals and their self-repeating processes, is explicable as a simple resultant of mechanical vortex movement.

Descartes had no satisfactory theory concerning the intervention of mind in the mechanistic system of nature, either of its sensitive or of its rational activity. Mind intervenes by directing the movements of matter, yet it contributes nothing whatever to the efficiency of the system. If we admit this discrepancy and regard thinking substance as a thing apart, then we have in the material system a purely geometrical scheme of the cosmos and a purely mechanistic explanation of its processes.

This cosmology should be called Cartesian because it is accepted by all Descartes' followers with purely minor variations of detail. Notably it is the cosmology of Malebranche and of Spinoza. Both these philosophers gave a spiritualistic or idealistic expression to it, but the geometrical nature of material substance is common to all Cartesians. The determinism of Spinoza's system follows directly from it. He conceives "all nature as one individual whose parts vary through an infinite number of modes, without change of the whole individual." [1]

Descartes' cosmology was extraordinarily simple at the same time that it was startlingly original and boldly conceived. It offered an identical geometrical princi-

[1] *Ethics* II, Lemma 7, Scholium.

ple which not only comprehended all the celestial movements, but also explained the attraction of the loadstone, the circulation of the blood, and even the mechanism of the animal spirits which in his scheme were the active principle of muscular movement. The great strength of the Cartesian cosmology, the reason for its extraordinary success and the grip in which it held the human mind for three or four intellectual generations, lay in the fact that its argument was purely mathematical. If it appealed to experience it was for illustration only. It demonstrated its theories in the manner of Euclid's elements and its proof seemed to partake of the same kind of directness and necessity.

The difficulties of this cosmology were scientific rather than philosophical, physical more than metaphysical. In Descartes' own time Torricelli's discovery, which led to the invention of the barometer, was very disconcerting and exceedingly difficult to reconcile with the principle of the plenum. Torricelli had found that a vacuum was produced in a glass tube of a specified length when the tube was first filled with mercury and then inverted in a mercury bath—the now familiar mercury barometer. The discovery was of far-reaching importance, for it concerned not merely the invention of a practical weather glass, but the truth of an accepted principle in physics. The old aphorism, "Nature abhors a vacuum," had been accepted from the ancient philosophy, but had acquired a new meaning in the Cartesian principles of extension and the indestructibility of movement. Descartes thought the very term vacuum was a self-contradiction, for it definitely denied the existence of the extension it implied. In his view the Torricelli empty space was not a void and did not imply the absence or deprivation of matter, but was a positive effect of subtle matter. Pascal, on

the other hand, deeply interested in the problem and in its bearing on his own theory of the equilibrium of fluids, accepted the phenomenon as what it purported to be and saw in it the evidence of an ocean of air surrounding the earth. He designed the crucial experiment by which the comparison was made between the weight of the atmosphere in the city of Clermont and at the summit of the neighbouring Puy de Dôme. It was not impossible, however, to reconcile the new discovery with the vortex principle, and in fact Descartes' cosmology held the field until it was displaced by Newton's discovery of the one universal law of gravitation.

The new idea which underlay the formulation of Newton's law of the inverse square, the idea of an attraction exercised by material masses on one another —an attraction the force of which varied uniformly with the amount of the masses, and the distance separating them—called for a new cosmology. Judged by any philosophical standard, Newton's cosmology was not an advance on the Cartesian. In effect it was a simple reversion to the old conception of atoms and the void for the sake of an immediate practical advantage, and Newton did not attempt, indeed he disdained to discuss, the metaphysical difficulties, or to try to reconcile the theoretical contradictions which the Cartesians had made explicit. A boundless absolute space, an absolute even-flowing time, mobile material masses, limitless velocity—these concepts have remained from Newton's day till our own the accepted basis of classical mechanics. The cosmological ideas have never seemed important in themselves in their bearing on physics, but physics must have a background. Physics and not metaphysics is the positive science, and to make that science secure it is not neces-

sary to give sharp logical definition or mathematical precision to the obscure and mysterious penumbra.

The shortcoming of both these cosmologies, the Cartesian and the Newtonian which replaced it, is their failure to include or to provide an interpretation of the facts of life and mind. Descartes indeed thought he had interpreted the active living processes mechanistically. Life presented to him nothing *sui generis*; mind, however, was for him substantially different from matter. Newton did not regard problems of life and mind as relevant in any way to the material world or concerned in its interpretation. They were physically conditioned, it is true, but to search out the truth concerning the cosmos Newton looked through the telescope; to search for the truth about God and man's soul and spiritual values generally, he read the Bible.

There was in Newton's own day a rival cosmology, contrasted in the most startling way with the substance principle of the Cartesian system and the materialistic principle of the Newtonian system. It was based on a new concept of substance and on a new principle of individuality. It took life and mind to be the real basis of existence, and materiality to be an aspect of the universe resulting from perspectives. This was Leibniz's theory and he described it as his new system of pre-established harmony. Like Descartes, Leibniz started without assumptions, but he criticised profoundly the Cartesian doctrine of substance, especially as it had been defined by Spinoza. Instead of a static reality supporting attributes and manifesting itself in modes, which Spinoza likened to waves on the surface of the ocean, Leibniz conceived substance dynamically as essentially activity, and this activity as individual and therefore a plurality. The cosmos consists of simple substances, the monads. Each monad is a self-

centred, indivisible, indestructible, unit centre of activity, mirroring the universe of active monads from its own individual point of view. The material world is the monad's perspectives, space is the order of coexistence of its perceptions, time the order of their succession. The monads differ, but only qualitatively and in degree, according to the distinctness or the confusedness of their perceptions. They enter into compounds as we see in the mind-body relation. Each cell of a living organism lives its own life and has its own perspective, but also it subserves the activity of the dominant monad or rational soul.

The cosmos accordingly presented itself to Leibniz not as a mechanism, but as a realm of ends. It is to be conceived on the analogy of a living organism. Its substance is not material extension and mechanical movement, but active force. The concept of substance as force brought with it a corresponding change in the concept of cause. Life is inconceivable apart from purposive activity, and therefore real causes are final causes. The cosmos is not an effect of mechanical motion, it is a harmony of purposes. What, then, we ask, is the materiality of the universe which thrusts itself so obstinately in the path of the living? Has it no existence on its own account? If there is nothing dead in the cosmos, if all existence is activity, if everything is what it does, whence does opposition come? Materiality, Leibniz answers, is a mass effect of indistinct and confused perception, just as the roar of the breakers on the seashore is the mass effect of numberless small sounds beyond the power of the ear to discriminate. For the supreme monad for whom there are no indistinct and no inadequate perceptions, there is no materiality. Thus the cosmos is conceived as a hierarchy of spirits.

Physical science could make nothing of the Leibnizian cosmology and left it alone. In philosophy it marks the beginning of a new and fruitful era of speculation. It was greatly strengthened by Berkeley's idealistic theory that *esse* is *percipi,* and that the continued existence of the sense-perceived world is dependent on the divine perceiving. For Berkeley the cosmos is the expression of the relation between active finite spirits and the infinite active spirit.

Cosmologies, therefore, fall into two main types: those which stress the materiality of the universe, the objective character of physical reality and its utter indifference to human thoughts about it or human purposes in regard to it; and those which see in matter mere negativity and privation and take life and mind to be primordial not only in the order of knowing, but in the order of being.

May it be that both types err by defect? Can we conceive a cosmology which shall do justice to each principle? *Prima facie* it appears impossible, because idealism and realism are, in the logical meaning, opposites—the substance of each is the affirmation of what the other denies. This is why a dualism of mind and matter has always proved ultimately unintelligible. Spinoza saw with clear intellectual insight that the difference between thought and extension, mind and matter, is not substantial, but he could not suggest any intelligible basis of identity beneath the difference. The two attributes of the one substance are never unified in his philosophy; they run parallel and remain distinct in all the modes.

There are certain conditions which attach to the very possibility of framing a coherent cosmology. It is necessary to keep these constantly in view as perpetual warnings. First, there is the plain fact that a

detached and disinterested view of the cosmos—and this is the ideal of a cosmology—is in its nature unattainable. Man is integrally and in every one of his various relations organically part of the cosmos and within it. If the cosmos lives, my living and thinking is within its life and I cannot study its life as I study the living objects of the world. Then secondly, the final cause of the cosmos, if it be striving for an end, is striving in and through our lives. Our cosmological scheme can be, therefore, at best no more than a fiction of thought, an image constructed out of material seen only from within, the attempt to apprehend by perception, and present as an object, the activity of perceiving. We form an image and project it before our mind to represent to ourselves the cosmos as it would appear to us were we to view it as outside observers. This is perfectly legitimate so long as we secure ourselves against self-deception, so long as we recognise that our image is formed to aid our concept and make it intelligible and that it is not a representation corresponding with a reality.

Our first reflection, then, on the nature of our existence—on our activity and on the universe in which it is exercised—shows us two streams of movement and change. To the one belong the living, to the other the inert. Both movements are continuous, but one appears as an uprush fed by some hidden spring, exhaustless in its source, yet limited in its force, for all the forms in which its activity finds outlet and disperses itself expend themselves and die. The other appears as a descent or deadweight, a falling back or dying down.

On the frontispiece of the original edition of Berkeley's *Three Dialogues between Hylas and Philonous* there is a vignette representing the two friends in a

garden before a fountain to which one is directing the other's attention. The legend is to be found in the final speech of the last dialogue. "You see, Hylas, the water of yonder fountain, how it is forced upwards, in a round column, to a certain height; at which it breaks, and falls back into the basin from whence it rose: its ascent as well as descent proceeding from the same uniform law or principle of gravitation." From this image we may derive a hint as to the possibility of a new cosmological principle. May not the relation between the materiality and the spirituality of the universe, between the living and the inert be a difference of two directions in a movement which is one and the same in origin? May not the uprush of the water of the fountain represent the push of life; the breaking of the water, the limitation of the living effort; the descending water, matter? May we not imagine the whole activity of the cosmos presenting some such picture to a detached and disinterested observer? To us it cannot appear so, not because we are not detached nor disinterested, but because our own standpoint as living beings must be in the uprush. We shall be unconscious of the uprush, for our place is within it; borne along by it we shall feel the descent of the water as resistance. Our outlook will be on a material universe, hostile and dead.

CHAPTER III

THE DESCENT OF MATTER AND THE ASCENT OF LIFE

Herodotus tells us that in his travels in Egypt he was very curious to learn where lay the sources of the Nile and what were the causes of the strange phenomenon of its regular annual overflow. He could obtain no information from the inhabitants. Some of the Greeks offered him explanations, but on criticising them he found them to be of no value and to be attributed not to knowledge, but to a wish to gain a reputation for cleverness. Twenty-five centuries have passed since Herodotus wrote his history, and not until our own day have his curious but quite natural questions received the answer of a scientific explanation. The inhabitants of the Nile Valley, before and since Herodotus, are not less intelligent or less inquisitive than other men, yet during ages they have lived, and been content to live, witnessing phenomena which invited explanation without any uncomfortable yearning to set forth on a voyage of discovery. Their river flowed past them ever in one direction, and they knew not and cared not what was the source of the supply and means of its perpetual replenishment. They could divert its course for the irrigation of their land and fertilisation of their soul, and this was all that concerned them. Is not this curiously analogous to the case of human knowledge generally, and physical science in particular? A stream of energy associated with what we vaguely call matter is running down,

degrading, dissipating. The stream is in one direction only, and science is completely ignorant of any actual case of reversal and unaware of any conditions which would explain its origin. Human beings are dependent on it as the Nile dwellers were dependent on their river and use it in the same way, arresting its flow and diverting its course to make it do human work and serve human ends. The physical sciences are one and all based on observations of the stream, are aspects of it, each justified in the utilitarian applications of it which it can devise. The metaphysicians seem to the workers in science as the curious Greeks seemed to the inhabitants of Egypt, men seeking vain answers to useless questions in airy speculation.

The most singular thing in the phenomenon of life and its evolution on the surface of this planet is that it is dependent on and wholly conditioned by the energy radiated by the sun. So far as our knowledge of life and its activity in material organisation is concerned, the earth itself and its constituent elements are a dead thing, merely the stage on which the activity is exercised. The earth does not supply even part of the energy. Yet the earth itself possesses an abundant, a practically inexhaustible store of energy locked up in its material constitution. Life does not draw upon it, at any rate not immediately, and though in a way it depends upon it yet it does not derive from it its sustenance. So far as life is concerned the earth is dead, inert matter, the surface of which is affected by the solar radiation. From the scientific standpoint it is indubitable that the earth is a body of like nature and similar constitution to the sun and must once have formed part of its mass. According to the cosmological theory at present in favour the planetary system was formed by a tidal action presumably caused by the

near approach of a star when the sun was a giant star of vast dimensions and great diffusion. The gravitational effect of such an approach is calculable and is conjectured to have caused first protuberances, then the detachment of gaseous masses revolving in orbits round the central mass. All theories of the natural history of the solar system, as well as the tidal theory, are founded on the belief which seems plainly deducible from the facts, that the earth was originally gaseous and incandescent and that its present state is a result of cooling. Living matter has not arisen as a stage in this cooling or by any combination of chemical elements causally dependent on this cooling. It is an independent phenomenon, dependent upon conditions it is true, but a phenomenon associated with quite minor changes and independent variations taking place on the earth's superficial crust, and due to a source of energy outside the earth itself. It appears that it cannot have existed in the form we know before the planet had become practically what it now is, a solid black body with an exposed crust, its surface radiation ended or practically negligible. If during the earth's incandescent state there was life in any form on it, that life must have been a different thing from the phenomenon we know and differently conditioned. When we calculate the age of the earth we are calculating the period which has elapsed since it became the possible stage of a biological evolution. We are able in various ways to estimate this period and we express it in hundreds of millions of years. The surface of this cooled-down planet now intercepts a very minute portion of the light and heat radiating in every direction from the still active central sun, and connected with this play of energy we have the phenomenon of the activity of life.

We have, therefore, the very curious fact that life is

not something which our mother earth has evolved out of her dying fires or formed by their means, but a mysterious agency which has appeared only when the planet's own activity had died down, and it brings under its direction and control a radiating force emanating from a distant source. The earth is just the stage on which life plays its part, and all the stored energy which the earth provides—coal and oil and running water—are stores of solar energy which life has magazined either automatically or by set purpose.

Life, then, is a phenomenon wholly associated with the stream of solar radiation intercepted by the earth's surface, and yet there is nothing whatever in our scientific knowledge of this radiation to give us the slightest clue to an explanation of its activity. Life is in fact as independent of the stream of solar energy as the Nile dwellers are independent of the stream whence they draw their means of subsistence. The solar radiation causes a group of surface phenomena on the earth, turns water into vapour, condenses it in clouds, redistributes it in rain, sets up air currents and ocean currents, alters the face of the land, produces climatic and seasonal changes, and all this independently of life. Here and there and now and then the activity of life, as if it availed itself of a watched-for opportunity, taking advantage of a privileged position, diverts to its own purposes infinitesimal portions of this seemingly exhaustless stream. Life plays a rôle very like that of the demon whom Clerk Maxwell imagined might be controlling a shutter in the path of the molecules, able without interfering with the actual energy of the molecular movements to reverse the energetical law, to contrive in fact that the water in the kettle on the coal fire shall grow colder while the fire grows hotter. Life seems to perform this kind of miracle.

The phenomena of solar radiation are mechanistically explicable, and independently of the life and mind which interfere with them in a specific manner. What is the nature of this interference? Let us look at it from the strictly scientific standpoint. Let us assume that the atomic and molecular systems of the modern physical theory are established beyond any possible disturbance from rational scepticism. Let us suppose that our concepts of atoms and molecules actually represent the physical reality which would appear to us had we heightened powers of perception. These systems are absolutely uninterfered with by life. An atom of oxygen or of hydrogen or of carbon is not affected in any way by the fact that it enters into the structure of a living body. Its physical and chemical nature are the same whether its locus be my bloodstream or a glacier in the Himalayas. Indeed its nature is inviolable whether it be on the earth or in the sun or on Arcturus. It is equally true of a molecule. Although the very complex molecules, like the sugars and starches, are met with only where there are biochemical processes, yet the molecules themselves are unaffected by anything we conceive of as living activity. What, then, is life? Science cannot represent life in sense-imagery, in the same way as it represents atoms or combinations of atoms or atomic activities. Life is not matter and does not create matter, it is activity and it creates agents; and the agents it creates are identical, notwithstanding their individual differences, in the universal nature of their agency. There is something or other, we know not what, and cannot define it other than by the vaguest term, activity, which without having any hold on the material structure itself uses it in order to procure the exercise of certain definite functions. The why, the how and the

wherefore science cannot discover, or at least up to the present has failed to discover. Science is rightly suspicious of interpretation by invoking final ends, for their introduction tends to make reasoning circular. It prefers to confine itself to description and to inference based on description; nevertheless it is impossible to dismiss the clear indication that life is purposive, however little insight we may obtain into its purpose. What, then, is the exact range of its activity? So far as we can see, it consists exclusively in making use of the instability of carbon compounds as a means of holding captive the energy of solar radiation and contriving its redistribution. Of the ninety-two elements which chemistry has so far discovered only one, carbon, appears to have given life its opportunity.

When we reflect on the nature of the activity of life and endeavour by scientific research to elucidate at least the immediate end to which it is directed, we see that it is distinguished from mechanical movement by its functional character. It opposes a certain kind of spirituality to the materiality on which it depends for its actualisation. It does much more than impose a particular form on the matter it animates, for what determines the form of all the structures it contrives to produce is always a specific function. Function is the dominant factor; structure is dependent and subservient. It is in this meaning that we are able to say of life that it is an essentially spiritual activity. It is not the expression or manifestation of the infinite variety of the characteristics and qualities inherent in the molecular structure of carbon compounds. Life is not a quality of the stuff we name protoplasm, for protoplasm may be dead, and dead protoplasm though inert is chemically identical with live protoplasm, and protoplasm differs only from other material combinations

in its activity by the degree of its instability. It is only living protoplasm to which we can track life as to its material stronghold. What makes it live, why when it lives it obeys an impulsion to function in non-uniform ways, we do not know. No analysis of the living cell of a living organism will disclose the practically infinite variety of functions the active protoplasm it contains will on occasion perform. In short, so far as life and living process is concerned we get no help whatever towards their comprehension by the most exhaustive analysis of the physical and chemical structure of the matter on which it is based. To comprehend life we must study it as a spiritual, that is, a non-material, agency. We must study the functions which living organisms and the living parts of organisms are intended to perform. The material structures are contrived for and wholly subservient to those functions.

When we concentrate our attention on this aspect of the problem, a remarkable contrast at once impresses us—the contrast between the cosmical evolution of the material universe and the biological evolution of organic structures. Both present to us continuous processes, but the direction of the movement underlying each evolutionary process seems the reverse of the other. The material universe presents to the physicist, and to the chemist, the spectacle of a force running down, exhausting itself. For example, modern chemistry has demonstrated scientifically that the element now existing in our planet as lead was at one time uranium or thorium, elements with a high radioactivity. It is variously estimated that the process of degradation of these particular elements in the archaic rocks has occupied from four hundred to four thousand millions of years. Again, when we consider the solar

radiation, on which the present habitable condition of our planet depends, we find that astronomers and physicists can calculate in mass-tons per second the weight of that energy. Everywhere in the material universe we see only force running down. Matter is in fact a descending stream of energy, the source of which is exhaustible. We have no indication in our whole outlook on the material universe of a reverse movement, or of the possibility of renewing the supply once it has run down. When we turn to the contemplation of the living evolution, the contrast is complete. We have scientific evidence of a continuous progression of living activity extending over perhaps hundreds of millions of years of the recent history of the planet, and this progression is an ascent, the evolution of ever more complex organic structures and ever higher spiritual achievement. Again, we have no indication of the source nor of what sustained the upspringing of life, but its direction relatively to the cosmical evolution is upwards. Man is apparently the last form, the present climax, but man is also the youngest and most recent form to assert predominance. In spirituality, therefore, using the term to indicate the opposite of materiality, there is a reverse direction of the descent of matter, an ascending movement. This direction of biological evolution is even more striking when we consider the scientific evidence that the first forms of life were of excessive simplicity, because there is nothing to indicate why they should have become discontented. What is the appetition which in living beings drives them to seek higher and higher expression? The more we reflect on the scientific facts connected with biological evolution, the more clear it becomes that this appetition cannot lie in the individuals of a living species itself; it must be in the active up-

spring of the life which has given the individuals existence. While, therefore, there is no appearance of interaction or parallelism between matter and life, though each is *sui generis,* though both seem independent, there is the remarkable fact that both manifest a definite direction in their activity and that these directions are relatively opposite.

If now we turn from the reflection on the relation of life to matter in order to reflect on the relation of life to mind, we are at once conscious that we are dealing with concepts which are affiliated to one another and with realities which are not heterogeneous. The reason is not far to seek. Life is active and purposive, matter is inert and mechanistic, and the idea of purpose rests ultimately on a concept of mind. All attempts to give a rational meaning to the idea that mind may be a quality of matter have proved vain. The idea of matter being conscious, as in the theory that the brain thinks, involves a patent self-contradiction, for it combines characters which are mutually and essentially exclusive. Locke in a well-known argument contended that there is no contradiction in the notion that the brain thinks, and held that there was no reason why it should not do so supposing God had wished to endow it with the power. Leibniz in an equally famous reply declared that mind is a unifying activity and can only be thought of as an indivisible unity, for divisibility is destructive of the very notion of consciousness; consequently the brain which is material, therefore spatial or extended, and therefore essentially divisible to infinity, cannot be that which thinks. This answer is unanswerable. There is direct opposition between the concept of matter and the concept of mind, but there is no opposition between the concept of life and the concept of mind. Life is con-

sciousness *de jure*. When we speak of the unconsciousness of a living being, or when we describe life by terms such as libido or conatus, terms which imply unconsciousness, we are using the term unconsciousness in a purely relative meaning and not in the absolute meaning which we give to the unconsciousness of matter. There is no gulf between life and mind, no gap, no stage in the evolution of living forms at which consciousness first emerges, and no subsequent stage at which consciousness becomes self-consciousness. In the same meaning in which the evangelist could say God is a Spirit we can say life is consciousness. What varies is the form of consciousness, and the degree to which consciousness may function in specific or individual modes of acting.

Our real difficulty in identifying life and mind is that life is impersonal, while mind is always associated with an individual subject of consciousness. Wherever we recognise mind we assume sensations, feelings, thoughts and actions which seem empty, meaningless terms if no one owns them. By far the greatest proportion of living actions are impersonal; all are purposive, but because there is no individual agent to whom we can attribute the purpose we class all impersonal actions as mechanical. Descartes led the way in consistently classing all vital processes as mechanistic, and science has followed him. Thus we make a clear distinction between the vital processes which go on automatically throughout our lives, and over which we exercise practically no direct control—the processes of respiration, circulation, metabolism, etc.—and the actions which are the result of perception and deliberate contrivance. These latter we attribute to our mind and consider this mind as a semi-independent reality superposed on our life, not necessarily bound

up with its existence, and indeed we tend to endow it with the right to exist in separation from the living body. This may easily be seen to be a false demarcation. The personal mind differs from living process not generically, but only as one mode from another of a specific activity.

Consider, for example, a living process in which there is no suggestion of a perceiver perceiving or being self-conscious, such as there is in all intelligent actions. When a tree sheds its leaves in autumn, the decay and death of the leaf is not brought about by old age or exhaustion, or by buffeting with external forces, and the fall of the leaf is not due to the force of gravity overcoming the force of cohesion. It is due to a living process which bears a close resemblance to deliberate action. The tree itself cuts off the leaf by growing a layer of bark cells at its junction with the stem, thus closing the vessels which connect it with the sap-flow and at the same time securing the stem against wound or scar when the leaf is detached. Although trees are individual and the process is carried out independently by every individual tree of a particular species in a specific way as part of its life process, we do not feel compelled to attribute personality and deliberation to the tree. Yet so far as the process itself is concerned, what distinguishes it from conscious process? It can only be a modal distinction. To whatever we are to assign the agency, it is quite clear that the action belongs to the category of finalism. It is ridiculous to class it under the category of mechanism. We need not suppose that the tree, or anything we may imagine to exist as a mind in the tree, is conscious of what it is doing, but when we say it is unconscious living process we mean by unconscious an inhibition of consciousness, and not its absence.

It is, however, when we study life in its integrality, when we read its history in the geological record and reconstitute its progressive evolution, that we see that mind is implicit in life and not something new, *sui generis,* imposed upon life or making life subservient to it in the way in which life uses matter. We find in fact that we must draw the fundamental or substantial distinction—not where Descartes drew it, between thought and extension, classing life under mechanical movement and defining mind as self-consciousness—but between life and matter. The antithesis between these is complete. There is nothing in common between the cosmical evolution of the material universe and the ascent of mind in the biological evolution.

There are many puzzling gaps in the geological record, but there is abundant evidence of absolute continuity. Everything points to the conclusion that life, from its initial and primitive activity and its primordial forms up to its present expression in the actual state of the earth's fauna and flora and human civilisation, is one continuous evolution. There is a blood-relationship between all the living. Were life only a state of matter or a quality of matter, a stage in cosmical evolution, it would present an entirely different kind of unity or uniformity. Its origin would not be single, but multiform. Water, for example, may be conceived as once non-existent and as arising at a particular stage in the process of a cosmical evolution, but we do not account for the identity of its molecular structure by supposing that its chemical emergence occurred at one point of space at one moment of time. We predict indeed that water will be formed wherever the constituent elements and necessary conditions of their combination shall be met with. It is entirely different with life.

The evolution of life as science reconstitutes it is not an inspiring story. Its outcome in the ascent and domination of man does not thrill us with aesthetic emotion or justify ethical optimism. This may be because our vision is limited, or it may be because for some reason, or for no reason, the force is inscrutable. In any case aesthetic satisfaction, noble ideals, belief in final good, find no spiritual sustenance either in the records of the rocks or in the present state of human society. It is not easy to reconcile the results of scientific research with the moral ideals of mankind. Many forms of life inspire only disgust, and many of the means employed by nature to attain her ends (to speak anthropomorphically) seem strangely at variance with our human ideal of fitness. On the other hand the discovery itself of the history is an impressive illustration of man's intellectual grandeur. The mysterious and elusive agency which man can name, but for whose secret he searches in vain, has produced a creature who can want to know the secret.

Consider what the story tells us. Take the transformation of vegetable forms. As we go back in the history of the stratified rocks, first the angiosperms, the flowering plants which now hold the predominant place in the vegetable world, disappear and the gymnosperms with the allied ginkgos and eucalypti take their place. Then as we go back these disappear and the cycads become the dominant type. These in their turn disappear entirely and we have next the vast flora of the equisetum type and the fern and moss forests of the upper carboniferous period. In the strata next before the most archaic we have gigantic land plants of the simple seaweed type of growth. Thus we have the story of a transformism, for we have no doubt the gaps are only gaps in the record, not from less effective to

more efficient types, if we have only to consider adaptation and power of survival, but a continuous creation of new and more complex forms with new and more complex functions which progresses by displacing and replacing the old. We see the same process and the same progress concurrently taking place in the evolution of animal life.

Nature in its objective aspect, therefore, presents to science the spectacle of two great processes in being, a process of cosmic evolution and a process of living evolution. They seem completely independent and the source of each is hidden. From the disinterested standpoint of objective science they are distinguished by their opposition. Matter is inertia; life is activity. To physics and chemistry the matter which constitutes the planetary mass which we are able to submit to scientific analysis is a stage in the degradation of energy. It presents itself as a stable equilibrium of forces in comparatively closed systems, atoms and molecules. It is essentially spatial in the sense that its concept is bound up with the concept of space. To abstract its spatial relations, internal and external, is to destroy it in everything which is essential to the idea of it. Time enters only as a factor in the concept of evolution. Cosmic evolution is definite in its direction from motion to quiescence, from activity to inertia, from instability to stability.

Life, on the other hand, is an ascent. It is not spatial. Space is for living beings their external aspect at any abstract moment of time. Life does not exist in moments; it only presents different aspects at different moments. It is not perduration in time, and its evolution is not a succession of states. Life is continuous creation. It is change, growth, development. It is not a succession of new moments each of which drops

the past to enjoy the present; it is the present activity of the past in new creation.

Physicists and biologists are helpless to carry us further. They have no clue to the relation between these two systems of objective phenomena, no interpretation of the opposing principles. Men of science indeed protest that they are not called upon to produce a theory. Their business is with the matter in hand, to describe phenomena and discover the laws of their occurrence. Even philosophers for the most part leave science entirely out of their domain, except only so far as its methods need criticism and require interpretation or justification. For the answer we must go to metaphysics. This is why metaphysics is a necessity of human reason. Even if we believe in the fundamental irrationality of existence, we can only support our belief by a metaphysical argument. Let us inquire, then, whether there are in the scientific facts themselves any clues to a metaphysical solution of this opposition.

In the first place we are clearly justified in arguing from the scientific facts of life and matter, that in neither case are we dealing with an integral view of reality, but in each case with a one-sided aspect. Just as the negative pole of the magnet cannot exist in abstraction from the positive, and just as the discovery of the negative charge on the electron requires us to postulate the positive charge on the nucleus, so a degrading movement in cosmical evolution postulates the compensating ascending movement, and an ascending movement in biological evolution postulates a compensating descent.

In the second place our difficulty in regard to the two orders of existence with their opposing principles is to discover any possible way of reconciling them as

complementary aspects of a reality integrally conceived. Nothing could be simpler than the natural suggestion that the ascent of life is the complement of the descent of matter, and that we have only to fill in the gaps in our knowledge in much the same way as we fill in the gaps in the geological record. Unfortunately the analogy does not hold. The two evolutions bear witness to the fragmentary nature of our knowledge of each, but they move on different planes, and the point of contact is not a junction and it is not a union. We are in much the same case as philosophers found themselves in regard to the scientific hypothesis of the circulation of the blood before Malpighi's microscope had revealed the vessels of the capillary system. The fact that the blood circulated had been practically demonstrated before the mode or mechanism by which it was accomplished had become even conceivable, so that Descartes was led to explain it as an effect of the expansion of fluids when heated and their contraction on cooling. So in science today the striking fact is the inability of physicists and biologists to demonstrate a connecting link between their respective domains, at the same time that every scientific student is profoundly convinced that the universe is a rationally explicable unity.

In the third place there is one character or direction of the two scientific domains which does afford some indication of a possible synthesis between the facts of matter and life. From the side of matter it is clear that though the cosmic evolution, which is held to account for its present state, is distinct from the solar radiation which has generated the special conditions connected with the evolution of life, yet this solar radiation is itself a phenomenon of cosmic evolution, and the one interpretative principle employed in physics

in its whole scheme of cosmic evolution is radio-activity. From the side of life we have also the fact that the principle of individuality is carried very close to the dimensions of the molecular and atomic systems of physics, if indeed it does not reach down to them. Microbial life postulates an individual activity of organic structures far below the detection of the supra-microscope. Very few indeed of the bacilli we now suppose to be active in virulent diseases have been seen by even the most delicate instruments of aided vision, yet we have every reason to believe that they function as individuals and reproduce their kind by germs. These germs must approximate very closely to the atomic and molecular mechanistic systems. It is not in microbial forms alone that we find this indifference, so to speak, to the spatial dimensions which receive their norm from the range of our sense organs. The vitamins which we now believe play an essential part in the regulation of vital processes, if they are material structures, are infinitesimal to a degree which defies all ordinary methods of analysis. It is also a curious fact that when it was hoped to find in the chromosomes of the fertilised ovum the material basis of the characters transmitted from the individuals of the old to the individuals of the new generation, it was found that there were not sufficient atoms in the chromosomes to satisfy the requirements of the partition.

The task of metaphysics, then, is to devise a rational scheme by which these two opposite principles, matter and life, shall be brought into unity in one concept. To reduce them to one another, to present life as emerging from matter, or matter as emerging from life, even if it could be conceived as accurate description of actual historical fact, would be no solution, for it would not explain. What our rationalising human

nature demands is an enterprise which will transcend the scientific facts in order to see the true nature of the reality of which they are fragmentary and partial aspects.

Is there any hope of success in such an enterprise? If there be it would seem to lie in studying the meaning and implications of the phenomenon of living activity which presents the most striking and perplexing problem—individuality. Life in its evolution is continuous, yet it progresses by means of generations of individuals whose activities are discontinuous, self-centred individuals repeating a certain limited range of actions for which they are structurally predisposed. Will this fact throw light on the dualism of life and matter and on the opposing principles?

CHAPTER IV

INDIVIDUALITY AND CONTINUITY

One of the most curious and instructive controversies of the seventeenth century was that which arose in connection with Descartes' opinion that animals are machines, that their actions are entirely automatic, and that our idea that their behaviour indicates that they have sensations, emotions and passions, and that they therefore suffer pain and seek pleasure as we do is pure illusion on our part. The argument was a simple one and it appealed powerfully to the theologians of the age, and in the seventeenth century everyone was interested in theology. It followed from the concept of the immateriality of the soul as a thinking substance. If the animals feel, then since feeling implies consciousness it must follow that animals have souls. If animals have souls they are suffering from the consequences of man's fall without the responsibility of original sin and without the offer to them of the means of redemption. It was consequently a great relief to the theologians to be able to appeal to a rational philosophical argument which denied that animals feel pain and pleasure, for it followed that the suffering and evil which are the consequence of the disobedience of our first parents signify nothing to the brute beast. It is true it was only a corollary of Descartes' philosophy, but probably more than anything else it contributed to make it acceptable to so many of the dignitaries of the Catholic church.

What is instructive to us, however, is not the doctrine —which seems only extravagant—but the argument, which approaches closely to the modern mechanistic conception of evolution and in fact is in principle practically identical with it.

The two substances, the basis of Descartes' philosophy, enabled him to treat nature (or the material universe), and mind (or the spiritual universe), in separate compartments. He could also by this conception with perfect sincerity protest that his natural philosophy at no point conflicted with anything which concerned the faith. He could live and die a faithful adherent of the Catholic church. What, he asked himself, using our simple reason, can we learn of the nature of the material universe? Without concerning ourselves with the details of his cosmical theory, let us come at once to the essential point. Material substance consisted, he held, in extension alone. Movement was something adventitious and indestructible which had been imparted to it. Movement is not translation, but change of relative position. In a plenum, for extension must be conceived as a plenum, there is no void; movement implies that the constituents of the whole extension simultaneously alter their position relatively to one another. This was the basis of the theory of the vortices. The original act, therefore, by which the present world came into existence, the act which we may conceive as the creative act of God, was giving movement to extension. This was in effect the setting in motion of a self-regulating machine. In a machine when it is set going the movement cannot be said to be initiated at one point and propagated to others, for with an interlocking mechanism the movement at any one point involves the movement at every point. The universal machine, the world, was con-

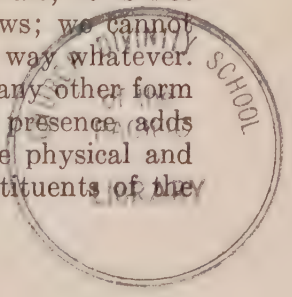
ceived by Descartes as having originally existed as pure, undifferentiated extension, not yet a machine. The conversion of this extension into a machine was brought about by movement. This machine has by reason of the indestructibility of movement become continuously more complicated, so that from a simple beginning there has arisen an ever increasing complexity. Living beings are parts of this mechanism, exceedingly delicate systems of movement, engendered by the subtle matter which is a product of the continuous activity of an indestructible movement in an indestructible plenum. The fundamental idea is that given a plenum, and given the introduction of movement into it, a world will be generated automatically, and this world will tend to develop in itself continually more subtle divisions and more delicate systems. The cosmos has arisen in this way by purely mechanical action, and living organisms are infinitely complicated systems of delicate movements.

If this principle appears to the modern philosopher childishly naïve, let him compare with it the principle which was universally accepted in the scientific world of the nineteenth century when the new idea of biological evolution first took definite shape in Darwin's theory of the origin of species in natural selection by survival of the fittest in the struggle for life. The facts left no doubt that all living organisms had a single origin and owed their form to a direct descent. To account for the origin of life itself was difficult; some held that living matter arose from non-living matter as the result of a chance chemical combination of the terrestrial elements themselves; some thought life may have been introduced to our planet from another world by a meteoric carrier, but all agreed that at some particular moment in cosmical history there had occurred

a unique event, the appearance of a first living cell holding within it a peculiar kind of matter which, by virtue of its constitution, exhibited a bias towards organisation, and maintained itself not by solidity and resistance to change but by nourishment, growth and reproduction. The scientific materialism of the nineteenth century declared in effect that, given a living cell, the whole subsequent historical evolution of specific forms of organisation could be mechanistically explained.

We know to-day, though it is far from universally recognized, that not only are we unable to explain mechanistically the origin from inert matter of a living cell, but that life itself in its integral manifestation cannot possibly be mechanistically explained. I do not mean that science has abandoned, so far as the evolution of life is concerned, its ideal of universal mechanism, but I mean that just as Lobatchewsky and Bolyai demonstrated the impossibility of a mathematical deduction of the postulate of parallelism, and by doing so altered the whole aspect of geometry, so the biological work of the last half-century has falsified completely the ideals of its pioneers. The advance of biology has made the comprehension of life by physics and chemistry ever more remote, and the reason is not difficult to appreciate when we come to close quarters with the nature of the phenomenon of life.

We cannot study life in itself apart from its manifestations in organic, animate individuals; it is not measurable; we cannot reduce it to laws; we cannot determine its conditions or fix it in any way whatever. It bears no analogy to electricity or to any other form of physical or chemical energy. Its presence adds nothing to and takes nothing from the physical and chemical qualities of the material constituents of the



organism. Its presence denotes that the organism is functioning in a specific way, its absence that the organism is not so functioning. Conceived as a substance or as an adjective it is equally elusive, equally intangible. It is the activity of a process which, when we study it scientifically, differentiates itself by two marked characteristics from every kind of physical and chemical activity. The first is that it induces in individual organisms self-centred, self-interested action. Life at any moment and at every moment is wholly represented by the individuals acting at that moment and all living individuals are finite with definite ranges of activity. The second characteristic is that life acts in and through generations of individuals for ends which transcend individuality. Life acts, therefore, not only in the individual, but beyond the individual. It presents to us the very peculiar, even paradoxical, aspect of a force which is limited and yet unlimited, or rather a force which acts through self-limitation and yet transcends its self-imposed limits.

The whole scheme of this individualising of living action seems, from the standpoint of scientific observation, to involve two consequences which characterise life as fundamentally irrational. One is the phenomenon of birth and death, the other is the lavish production of individuals. If we take any single individual of any species in the full range of its activity, the whole end of life's effort seems attained in that individual's actual experience and actions, yet each individual has to pass through stages of adolescence, maturity and decay, and when it dies its accumulated experience, its memory and its aspirations, so far as actual efficiency in the world is concerned, are nought. From the beginning of reflective thought till the present time this aspect of human individual lives has

seemed to philosophers so irrational as to necessitate the postulate of a future life of the soul. The same irrationality, however, extends throughout the whole range of life, and therefore to be consistent we must invoke the postulate even for the vain desire of the moth which perishes in the flame. This has always seemed extravagant. Then again we find that many forms of independent individual life are interdependent, so that death may intervene without any respect whatever for the individual's own range of activity. Just as an earthquake or volcanic eruption may involve the wiping out of a whole community, so when an animal, say, a human being, dies, not merely does that unity of organic processes which is the man perish, but in his death is involved the death of the active protoplasm in all the individual cells of his body which in subserving his life have been living their own lives. When I die, every cell of my organism, even the white blood corpuscles with their free-moving independent individuality, must submit to my fate. It is true that the process of life involves the successive birth of individuals as well as successive death; it is true also that an important function of the individual, often appearing as the only function, is reproduction, yet all individuals develop functions and store experiences independently of reproduction. It seems, therefore, that life has no other mode of realisation save that of individual forms performing actions and enjoying experience, and yet has no concern for the continuity or permanent preservation of individual experience.

Still more irrational is the lavishness of life in the production of individuals. It was on this irrationality that the mechanistic theory of evolution by natural selection was based. A teeming abundance of individual forms is generated of which only an infinitesimal

number can reach birth, and only an infinitesimal proportion of those which are born can attain full development. The prodigality is stupendous.

And this individuality itself presents a strange problem. It is the organisation of a system of independent actions, the far greater number of which have no other meaning and purpose than the maintenance of the organism in being and the reproduction of its kind. The only incentive to the individual to persevere in his existence is the enjoyment of his activity in living, and the spur to drive him forward is the pain and discomfort which failure to persevere or slackness in persevering involves. Yet every individual appears to possess a superfluity of energy beyond what is required for subsistence, and which displays itself in works of supererogation in relation to the demands of life; and in human beings it may take a form which excites our wonder. When we witness the musician's skill, the expression of genius in works of art or in scientific or philosophical invention, or even the ordinary efficiency of the artisan, we rejoice that man does not live by bread alone; but what evidence is there that the living push itself which has given us this power of achievement cares ought or in any way preserves for its purposes the attainments which we as individuals value?

The phenomenon of life, therefore, although it presents the spectacle of an activity working in an opposite direction to material change and to energetical radiation; although it appears as a new visitant to our planet, interfering with the stream of radiation, which at definite points and at privileged moments it intercepts and even reverses the direction; although from apparently the lowliest beginning it has evolved most intricate and highly organised forms of vegetable and animal life; and although it has given to man in self-

consciousness the power of interrogating the force which has produced him; yet appears fundamentally irrational, an aimless striving to live and to continue to live, indifferent to the values it seems to be solely concerned to realise. Life may be the spiritual activity of an immaterial agency, but if it be it seems indifferent to our ideals, to what we in our moods of rational reflection cherish and conceive to be good. So far as we can interpret evolution, the intellect with which we are endowed seems designed to give us efficiency in the struggle, and to be bestowed for no other end. If we look forward instead of backward, the prospect is only of the coming into being of new generations of individuals possibly with vastly superior powers and more efficient modes of action, but with no suggestion of a final end either in or beyond the new species and the new individuals of the new species destined to replace us here. There is nothing to indicate that the whole phenomenon of life will not itself, like the individuals it has produced, die as it was born and leave no trace. In its scientific aspect life offers very unpromising material wherewith to erect a metaphysical construction, even could we be sure of the foundation on which to erect it.

The most we can do is to study the fragmentary aspects which the cosmos presents to us and try to discover, if we can, the hint of some principle which lies deeper than the phenomena and may explain them. It is hopeless to try by piecing together partial views to weld them into a consistent whole, but it may be possible by following a clue to reconstruct the world scheme on the analogy of the naturalist, who from a footprint may infer a complete fauna.

Can we gather then, from the cosmical evolution and the living evolution, each of which we evidently

know only in part and see in a mirror darkly, any indication which will lead us to form a consistent idea of the great reality? This is not the quest of the absolute. Our enterprise is much more modest. We are concerned only with scientific facts; it is their partial aspect and dependent character which sets our problem, and our search is for an interpretative principle which will combine and reconcile them. Moreover we are to look for this principle in the facts themselves. Do these facts give us a clue to their interpretation? Do they enable us at least to infer the nature of the real agency in the universe?

Before we enter on our inquiry, it is well to take warning. There is one easy way, tempting in its allurements, of finding a quasi-rational interpretation of the problem. It is the way which Descartes followed and which in one form or another has attracted many philosophers, ancient and modern. This is dualism. The soul, it is said, is of different substance from matter; the living body is its temporary home, the world is the sphere of its temporary activity, but the soul is naturally immortal, is therefore not subject to the vicissitudes of material substance and temporal existence, and it alone is rational. This is a false route, and to follow it is to abandon hope of any rational solution of the problem of life and matter and their relation satisfying to the scientific and philosophical conscience. On this path we must resolutely turn our back, but let us first make sure that we see the reason why.

It is conceivable, no doubt, that the soul may be an independent spiritual existence, naturally immortal, and in some form it is a belief which has been and now is held by probably the great majority of mankind. It can be supported by philosophical arguments of un-

doubted force. If it be true, however, it presents new and special problems without throwing any light whatever on the problem of life and matter. Alike in science and in philosophy, mind apart from living body, living body apart from mind, are pure abstractions. Mind and body are distinct, but inseparable. There is no entity, life, which the biologists can experiment with as something in itself; it is an abstraction from forms of living activity. There is no entity, mind, which the psychologist can deal with as something independent of all modes of living activity. When we think we can imagine disembodied minds we are victims of an illusion; we can only imagine them by creating for them an embodiment. To imagine souls without bodies is no more possible than to imagine sight without eyes to see, sound without ears to hear, thought without imagery for expression. Abstraction is useful and bears witness to the possession of high intellectual power, but to reify abstractions is to create false problems. In science and philosophy the real problems concern the concrete. In the problem of life and matter the facts are concrete and we seek to interpret them. The principle which appears directive in each class of facts is abstract, and we can only be satisfied when we find a concrete principle which will interpret both classes of fact and overcome their opposition. Dualism is essentially irrational; and all science and all philosophy bear witness to the instinctive aversion of the human mind to rest satisfied with unreason.

If, then, we reject dualism, the alternatives before us are two, and two only. Either life is a purely material phenomenon, or matter is a derivative of life. The first is the theory of materialism, the second is the theory of creative evolution. If we choose the first alternative we have to explain the paradox that unreason can

generate reason. If we choose the second we have to explain the fact that, wherever we meet with living activity, we find some inert materiality present as a pre-existing condition. With this problem before us let us turn to the concrete facts themselves to see whether they afford us any clue to the mystery.

1. Let us consider first our knowledge of matter. It is significant that the remarkable success of modern physics consists in the discovery of a means of breaking down certain of the atomic structures, or rather of disturbing the equilibrium of forces in an atom by displacing an electron from its orbit. The ideal of the modern physicist is to discover a means of releasing the energy represented by the relatively stable equilibrium of the forces in the atom, and the hope of the practical man of science is to devise a means of utilising the energy so released. In this work the physicist is simply anticipating the work which nature itself is supposed to be doing. Everywhere in nature we see a degrading movement, energy running down, forces radiating. Nowhere do we see the building up which must have preceded the running down. Even when in the stars we seem to see the laboratories, as it were, in which the atoms are being generated, we can only envisage their formation as a cooling down process. We suppose the atoms in the terrestrial constitution are a result of the earth's cooling.

2. A further significant fact is that the atoms of modern physics with their constituent electrons and protons are not indivisible reals in the meaning of the old atomism. Modern mathematics has made the resolution of matter into indivisible reals for ever unattainable. This does not mean merely that the atoms cannot by any imaginable instrumental aid to vision become actually discernible (because their magnitude

is less than the waves of light in the visible spectrum and therefore they cannot reflect those waves), but that it is impossible to conceive a limit to their divisibility. If, for example, we multiply the atom by 10^{22} for two of its dimensions, so that we can present the enlarged image on one plane, we thereby magnify the atom to the dimensions of the solar system. Conversely by altering the sign and multiplying the solar system by 10^{-22}, the solar system becomes of atomic dimensions. The universe itself sets no limit to our mathematical operations. It gives us on its own account no absolute standard of magnitude and submits to our apprehension no final irreducible bricks, as it were, of its constitution.

3. In chemistry we meet with another significant fact. The striking success of the modern chemist in obtaining synthetic products, particularly the biochemical products of the carbon compounds, is not consequent on a discovery of the nature of living agency, for it affords us no insight whatever into its mode. What the chemist produces artificially is one or more of the particular combinations by means of which life stores in magazines the solar radiation which it will direct into new channels and hold in reserve for the time-explosion which will release it. The incomprehensible thing is not the mechanism by which life works, but the living agency. The organising activity behind the material organisation is what science so far has failed to comprehend.

4. With regard to the scientific concept of matter, it is most significant that every fact of materiality when submitted to physical analysis resolves itself into a form of energy, and however far we are able to carry the analysis, we never reach the actual particle of stuff occupying an impenetrable space which corresponds to

our idea of matter and is the object of our search. When, on the other hand, we submit any fact of materiality to chemical analysis, it resolves itself into sensible qualities, and we never reach the something or other, we know not what, which we imagine must exist as the substance in which sensible qualities inhere.

5. The first thing we notice in the phenomenon of life is the clear evidence it presents of continuity. Life is not sporadic. Spontaneous generation is not merely undiscovered or disproved, and if we reject the hypothesis it is not because it is contrary to experience, but because it is contradictory to our concept of life. Even in its most materialistic aspect we have to conceive life as essentially the continuity of the past in the present. To suppose a gap of non-existence in its history is fatal to our fundamental idea of it. And yet life manifests its activity in the production of individuals true to type, completely isolated from one another in their material organisation. The species of these individuals have an individual development along distinct lines of evolution; they progress *pari passu,* each along its own line and in its own direction. The evolution of life in its historical aspect is a genealogical tree, branching out as it grows, with a single origin and single continuous history. But if evolution is like a tree life itself is not, for there is no flow of the sap sustaining the members and subordinating them to the common life. Life is represented at any moment and at every moment by the individuals of the species which coexist at that moment.

6. Life is purposive in the meaning that all living structures are organised with regard to functions. The purposiveness of living process is its distinguishing character. It is this purposiveness which separates the scientific domain of biology from physics and chemis-

try. Life is not purposive, however, in the sense of finalism or teleology, for there is no indication whatever, so far as the simple scientific facts are concerned, of a purpose or final end of living activity itself. Indeed the phenomena of life presented to our scientific observation would seem to negative quite definitely the suggestion of a final end. There is a curious contradiction in the nature of life considered as purposive. On the one hand it seems as though the whole direction of living process was towards a perfectibility of the individual, as though the individual, his range of actions, his enjoyment of freedom, his self-possession, were the goal to which evolution is directed. For it is in the individual and in no other form that life's activity is realised. Yet, on the other hand, the whole purpose of individual existence seems to be the carrying on of the life process beyond the individual. Individual existence seems entirely subordinate to the securing of new generations. To take the most striking illustration in ourselves, the sex relation, it seems as though the end and consummation of our being lay in the love union, with all the richness of individual life which centres in it and develops from it, and yet so far as it represents the life purpose it is the initiation, not the consummation, of an end which is racial and not individual. We have, therefore, the perpetual contradiction that life exists only in and for the individual and the individual exists only for the sake of new generations of individuals.

7. There is a certain materiality which is the direct product of living process. The dead body is mere matter. So far as its physical and chemical constituents are concerned, it is not matter which life has created, but only matter which life has transformed. But if there is no pure matter in abstraction from form, and

if all matter is resolvable into energy systems in which forces are held together in stable equilibrium, then life produces particular forms of such energy systems. If it does not create energy, it materialises it. A very large proportion of the earth's crust—some geologists go so far as to say all of it—owes its present condition to the fact that it has formed part of the organisation of individual living forms. The limestones and the coal measures are demonstrably so, in their present form being direct by-products of life. They are certainly not the end or goal of the activity; they are like the dead body, waste product.

8. Life presents to us the strange spectacle of an activity which is precarious, very limited in its operation, enshrining itself in individual organisations constructed of a matter taken *ad hoc,* wholly dependent on individualisation, yet only using individuals instrumentally, setting itself limits and transcending its self-limitations, expending its activity in producing organic structures of infinite complexity and casting them aside as waste matter; a spiritual activity of unlimited resourcefulness, yet in which we search in vain for evidence of motives which we have come to regard as spiritual.

9. In mind we have the strangest phenomenon of all. The highest attainment of the evolution of life as it appears to our human observation is reason in man, yet this reason is not continuous from generation to generation. It is transmitted as a potentiality only. The form and expression of intellect are dependent on circumstance and start *de novo* in each individual of each generation. It seems as though it would be otherwise if life valued intellect for itself. It cannot be due to any lack of power in the life-source that the consecutive thinking which gives unity to the individual

is not transmitted from the old to the new generation in the same way that instinct, both in its generalised modes and in its specific responses, is passed on from generation to generation of living forms, animal and vegetable. Intellect, on the other hand is transmitted only as a potential mode of activity; in all its outward manifestations it is discontinuous. Life seems to avail itself of the reasoning power in man as a serviceable instrument, but to discard its achievements in individual men as ruthlessly as it discards the dead bodies which it leaves to blend again with the elements out of which they were formed.

10. There is, it is true, an intellectual continuity of a kind which transcends expression in individuals, for example, in the development of Greek philosophy, the newer development of modern philosophy, in the scientific discovery of the last hundred years and generally in the movements, religious, scientific, political, moral, which give their character to human civilisation. It is, however, only an external continuity. It is the continuity of a development carried on by individuals each of whom has had to start by artificially acquiring the legacy of the past. It cannot but seem to us that, if life had valued this achievement of rational continuity which to us is the ideal of spiritual existence, it would have transmitted reason from generation to generation as easily as it transmits from generation to generation the instinctive activities of ants and bees. Reason appears in man, however, only as the specific mode of individual activity, a mode devised to serve the individual in his actions, not the goal of human existence.

Such are the aspects partial and fragmentary of the reality which comprehends our finite experience. Do they enable us to form a conception of the reality itself?

To form such a conception is the task of metaphysics. It is no idle curiosity, for it is imposed on us by that appetition which is inherent in the nature of reason. The rationalising motive, manifesting itself in every branch of human intellectual activity as a never satisfied desire to attain a synoptic view of reality, itself has led philosophers in all ages to try and formulate the idea of God. It is our task in philosophy to-day. We have, however, the peculiar advantage that we can enter on it not only unhampered by theological presuppositions, unfettered by authority, but with the freedom which scientific achievements have secured and the confidence which scientific method inspires.

We have, then, in science three inexplicables, three kinds of facts which by their conflicting principles indicate that we are observing only aspects of the universe which comprehends us, aspects which reveal their partiality and fragmentary character by the absence of self-consistency. These demand of us a work of imagination to give them completeness, in much the same way as we have to fill in by creative imagination the other side of the moon, which no one has seen or expects to see. These three kinds of facts are the phenomena of matter, of life and of mind. Matter, the first kind of fact, reveals itself to scientific analysis as a descent of energy, taking various static forms in its flow, but always degrading. Reason demands that we supply from imagination the source of this flow and the process by which it is kept as constant as the flow is constant. Life, the second kind of fact, is a phenomenon which manifests itself as an organisation of matter. It seems to reverse the descent of matter and to bring about an upward push towards greater complexity of function. It does not disclose to us what its relation to matter is and whence its activity is derived.

It uses matter to manipulate solar energy. The source and the goal of its activity are not revealed in any of the phenomena we can observe. Mind, the third kind of fact, is a phenomenon entirely associated with life. The facts of mind as they can be observed scientifically present themselves as abstract in the literal meaning, and as exercising no kind of efficiency in the natural world.

It has always seemed that two alternatives, and two only, are open to philosophy in its metaphysical enterprise, and the approach to the conception of a comprehensive reality has always, been therefore, either from the side of matter or from the side of mind. Philosophical systems are either materialisms or idealisms, and the general criticism of all of them is that the strength of any system lies in its denial or at least in its ignoring what the others affirm. The reason is not far to seek. Neither matter nor mind, in the ordinary scientific acceptation of the terms, is concrete in the required meaning, and there is no principle of relation between them which will weld them into a solidary unity. Matter in the ordinary meaning denotes actuality, but science, like the dove from the ark flying over the waste of the waters, can find in matter no resting place for the sole of its foot. Mind, on the other hand, is to ordinary common sense purely abstract with no real efficiency in the world of action. There is no passage from thought to thing. Thought is always about things, it cannot generate them The strength of idealism has always been its emphasis on form and its appeal to the inconceivability of formless matter, but form is abstract and to the plain man flesh and blood will never resolve itself into categories.

Have we not in life a third alternative? Life is essentially concrete. Do not all the significant facts which

we have just set forth point unmistakably and with cumulative force to life as the principle in which we may find the clue for the rationalisation of the world-concept? But is not life, it will be said, also an abstraction? In a sense it is, but in a quite different sense to the abstractness of matter and mind. If we abstract from matter and mind, life does not remain over, a third thing floating independently, awaiting an opportunity to attach itself. Life manifests itself in material organisation and purposive activity, matter and mind, therefore, enter into the concept of life as necessary factors not as independent constituents. We cannot leave matter or mind out of the account and still have the concept of life. This is what I mean by claiming that life is the concept of a concrete reality, and not a mere abstraction.

The phenomena which we study in biology are not privileged in any way as knowledge. For science, life is no more than a special class of natural facts, with no suggestion or indication in them that they introduce us by any secret arcana directly to the ultimate reality, the absolute. Biological facts do not lie on a higher level than physical facts. Philosophically, on the other hand, life reveals to us a kind of unity which has no counterpart in the science of inert matter. It is scientifically established that all the phenomena of life belong to one evolutionary process. The life which is presented to us as a creative evolution on our planet reveals neither its origin nor its goal. It is certain that it is a late intervention in the planet's history. It is impossible to conceive that it has generated our cosmos. I am not implying anything so absurd as the supposition that the creative evolution of organised material forms can be made to account for the creation of the universe. What I do suggest is that here we

have the one fact in our scientific survey of the cosmos which offers to us an analogy of what the universe in itself may be, the one fact which gives us the key to the construction of a metaphysic of existence. The universe as a whole—the stellar system and the island universes and anything we may imagine beyond—may be conceived to have been generated, so far as their actual condition is concerned, by an activity analogous in its mode to what we know as life. This life which we actually know in its working, but the origin and the goal of which we know not, may be conceived as one and continuous with a vaster life-activity whose débris is our cosmos. It may seem too bold a generalisation, but at least we can say that in life as we experience it we have a concrete, self-consistent reality on a limited plane which may be typical of the reality we try to conceive on a universal plane.

The physical universe is the locus of the evolution of life, and our living experience is the outcome of that evolution. What is implied, then, in the nature of existence, if we follow our analogy and regard the universe itself as the dead remainder of a larger life? It is clear that the analogy will not offer us a final solution of the problem of existence in terms of substance or of cause, for there is no answer to the question: What is life? We may, however, be led to two conclusions of the highest philosophical importance. The first is that matter and mind and the antithetical principles they represent are not irreducible surds of a mathematical equation, but inseparable aspects of an activity the characteristic mode of whose expression is individualisation. The second is that the continuity of existence is not static or spatio-temporal, but an impetus to new creation. The recognition of life as an interpretative metaphysical principle sets no bounds to

reality, and holds out no prospect of comprehending in a concept the absolute conditions which determine it, but it does replace the quantitative infinity of the old atomism with a qualitative infinity of inexhaustible richness.

Let me try to make my meaning clear. In taking life as a metaphysical principle to interpret existence I do not mean that the world has a soul, or that the universe of sun and planets, stars and nebulae, is the body of some micromegas. The view I am putting forward has nothing in common with speculations of this kind. What I do mean is that the life which presents itself to us as one creative evolution has two essential characteristics—it acts effectively by individualising its force, and it acts continuously by discarding its individual organisations. It is these characteristics which, applied on a universal plane, interpret the aspect of matter as a degrading energy, and the aspect of mind as an aspiring energy.

CHAPTER V

THE GOD OF PHILOSOPHERS

Pascal, when recording the ecstatic experience which determined his final religious self-dedication, wrote on the scapula which thenceforward he wore near his heart: "Dieu d'Abraham, Dieu d'Isaac, Dieu de Jacob —pas le Dieu des philosophes et des savants." The God of the philosophers has never responded to the emotional needs of the human spirit or satisfied its religious ideal. The idea of God and the affirmation of the existence of God, when it is based on intellectual grounds, even when posited as the basis of a complete system of philosophy, has not secured philosophers from the condemnation of religious-minded men. Spinoza was anathematised as an atheist by Jew and Christian alike. The God of philosophers has always appeared a cold intellectual abstraction, affording no enlightenment to the perplexed and no consolation to minds in distress. Yet the concept of God is the alpha and omega of philosophy. Even science, though its progress has shattered the old idea of the great artificer, and though it has adopted the attitude of agnosticism, must posit some principle of unity, even if it has to name it the unknowable.

As matter of fact science has been the driving force which has compelled philosophers to give expression to the idea of God, and it is the progress of science which has required philosophy from time to time to revise the concept of God. The great metaphysical

task which confronts us to-day is to re-form the notion of God which the mathematical philosophers of the seventeenth century have bequeathed to us, in order to bring it into accord with the new concepts of biological science.

When we refer to God in philosophy we do not envisage Him as a hypothetical personal being who may or may not exist, and the truth of whose existence depends on evidence of a sensible nature. The God of philosophy is an intellectual concept and the truth of the concept depends on logical evidence. It is a concept so original that the difficulty of understanding how it arises is rather a difficulty of understanding how it could fail to arise in any mind when it attains the stage of self-consciousness. Self-consciousness is the self-reflection of our conscious activity, and this reflection is a perception of limitation. How can we perceive limitation without having the corresponding perception of encompassing existence? The counterpart of the affirmation "I am" of the self-conscious subject is the affirmation "God is," the affirmation of an encompassing existence in which I live and move and have my being. How to characterise *existence* is the philosophical problem of God. It is the ontological problem.

The God of philosophers is a God who has no psychology and no history. This is why the philosopher's concept makes no appeal to the emotions. It has, nevertheless, a very high intellectual value. The ontological argument which appealed with such compelling force to the mathematically disciplined philosophers of the seventeenth century, and which seems to the scientifically disciplined philosophers to-day a pure logomachy, must be judged by its metaphysical implications.

The argument in its formal presentation was: We

have the idea of a being infinitely perfect; the idea of such a being includes existence, because if existence be excluded the idea is lacking in a perfection and inconsistent; therefore, since we have the idea of God, God exists. The most famous reply to the argument was given by Kant. It was essentially the denial that existence is an idea. The idea of a hundred dollars, said Kant, is the idea of a hundred existing dollars, but it is not their existence; their existence is the practical fact that I have them in my pocket, a fact not included in the idea of them. This was, however, to miss the philosophical significance which Descartes and his followers had given to the theological form of the old argument. Existence was for them the essence of the divine substance, in the same sense in which extension was the essence of material substance and thought the essence of mental substance. If we state the argument in the Cartesian form we see at once that Kant's illustration does not apply. I think, therefore, I am; my thinking is finite thinking, therefore my existence is finite existence; finite existence posits infinite existence; the idea of God or infinite being, therefore, affirms existence. Such an argument does not apply to material things like dollars; it applies only to infinite being. It affirms that existence is the essence of the idea of infinite being, just as "I am" is included in the idea "I think." It is not by logic that the ontological argument has been superseded; it is rather the progress of science which has made it useless as the initial starting point of a philosophical construction.

The progress of science has brought with it a complete subversion of the mediæval concepts of substance and cause. It has replaced these concepts with the scientific principles of uniformity and determining con-

ditions. The scientific interpretation of natural phenomena has made the interest in God more remote, God's existence more problematical, and even the idea of God unnecessary. Mathematics and physics are making it increasingly difficult to assign a place for God in our co-ordinations and constructions of the universe, and the necessity of positing a first cause or of conceiving a designer, a necessity which seemed *prima facie* obvious to a pre-scientific generation, does not exist for us. The old philosophical problem as to whether the world is an emanation of God or his deliberate creation is no longer a vital issue, because the imagery on which either concept depends is strangely out of place in the scientific scheme. Newton and his followers were hard pressed to reconcile their concepts of space and time with their idea of God; but what was their difficulty compared to ours? We measure the universe in light-years and conceive its spatio-temporal material in electro-dynamical terms. The absolute is not only further removed than ever from our horizon, but, at least in physics, it has lost its meaning. What sort of conception of an infinite being, possessed of any imaginable attributes, would serve us to complete and round off and give consistency to our world-picture? Take, for example, the fundamental basis of our modern method of scientific co-ordination, the principle of a constant velocity—how can we conceive God's relation to this? If we imagine God to be independent of the velocities of propagation and indifferent to them, surely in the very idea we contradict our principle of universal relativity. If in spite of this we proceed to personalise and characterise this infinite being, moulding him into our own image (how can we do otherwise?), we have the problem of the relation of nature and grace in a form

which would have made even the genius of a Pascal despair.

The plain truth is that the evolution theory has antiquated all the theodicies. This is not because it has disapproved, or dispensed with, or superseded the concept of God, but because it has rendered meaningless the attributes of omniscience and benevolence which gave rise to the problems of error and evil.

According to the principle of evolution, human beings, in their individual activity, are one of the forms of existence of a universal activity of life which has realised itself by developing along innumerable specific lines with an ever progressing power of adaptability. The immediate consequence of accepting this theory is that we conceptualise life. We conceive life as the universal of which all species are particulars, and all particulars exist in the mode of concrete, free, self-centred, acting, individual organisms. This universal reality, life, takes in the evolution scheme the place of the idea of God in the mechanistic scheme. That is to say, it expresses the idea of the immediate universal source and ground of our individual being. To attach to this universal idea the attributes of omniscience and benevolence, which to the old philosophers seemed obviously to attach to the idea of God, is not only manifestly arbitrary, but is a direct contradiction of evolution as an interpretative principle. Let us reflect first what omniscience, and second what benevolence, would imply were we to affirm them of the source of our being as the evolution theory requires us to conceive it.

We individual human beings control, within the range of our activity, the reality of an external world by apprehending its nature and conforming ourselves

to the conditions which we observe in it and term its laws. Knowledge or science is this apprehension, and by means of it we are able to perform our actions. Our knowledge is as characteristically human as our actions are. Knowledge and action, thought and thing, like the two corresponding activities knowing and acting, thinking and realising, are inseparable in fact. If the theory of evolution be true, if man is the outcome of a specific development of a life principle, one in origin, which like a genealogical tree has, in branching, continually opened divergent directions. then clearly the mode of apprehension which we distinguish as human knowledge, the form of human mentality, is as integrally a product of evolution as is the form of human action which is inseparable from it. What, then, is this human mode of apprehension? Our knowledge consists of two kinds of mentally formed things, the product of two kinds of activity, inseparable in fact, but distinguishable in analysis; perceptions and conceptions. *Perceiving* furnishes us with aesthetic imagery, and this imagery is determined for us in its outlines, and in its quality, and in its general character, by the structural apparatus and consequent natural selection made by our sense organs. *Conceiving* is dependent on this activity of perceiving and on the sense images which it provides, but it furnishes us with concepts. Conceiving is in the first instance an apprehension of relations; in its more developed form it is an integration of our discontinuous experience. This characteristic mode of human conscious activity which produces objective knowledge is what we distinguish as rational activity and name intellect, but it is not the only mode of conscious activity, nor indeed is it the only human mode. A great part of human conduct is due to instinctive action, and below the instinc-

tive range there is non-conscious reflex action. The character of instinctive action is that a definite and immediate response to a definite stimulus is evoked by a kind of libido, which requires no mental mediation of images and concepts. What, then, if this be a true account of knowledge, does omniscience signify? It may mean either of two things. First, it may mean that our human intellectual mode of apprehending is also the mode of apprehension of a being transcending human limitations, and able, as a consequence, to possess knowledge without images, because without the restrictions of sense organs, and also without concepts, because the images on which concepts depend will have disappeared in an immediate intuition of reality in its integrality. Some such idea was no doubt at the basis of the affirmation of omniscience as an attribute of God. The God of the theologians, omnipresent and eternal, acted intellectually without the limitations which define for us the intellect. It is easy to see that from the human standpoint such perfected science is indistinguishable from nescience. To attribute omniscience in this intellectual meaning to God, conceived as the life principle of a creative evolution, is entirely meaningless.

Omniscience, however, may have another and different meaning. Instead of the supposed perfection of a human intellect it may be the conception of the combination or union in one consciousness of all possible modes of conscious activity. The omniscient mind would then be conceived as a mind to whom all minds were open, a mind which in one intuition would apprehend reality not from one individual standpoint, but from all individual standpoints. Some such conception as this entered into Leibniz's idea of God who pre-established harmony as part of the creative act.

In this meaning we cannot reject the attribute as contradictory or unintelligible; we can only say that applied to the life principle it is as meaningless as the other. Leibniz conceived the universe as consisting altogether of living units, but he had not the faintest glimmering or anticipation of our modern concept of creative evolution. His philosophical task was to make explicit what is implied in the creation of a world, not of matter and movement, but of free living agents. The creation of the monadic universe implied in the creator an omniscience which enabled him to see every activity from its own individual standpoint, and thus to harmonise the individual actions. From our modern standpoint the harmony is inherent in the very idea of life as creative evolution.

The attribute of omniscience, then, is our own ideal of intelligibility and rationality raised to infinity, and were it theoretically realisable without contradiction it would still be meaningless as an attribute of life in its universality, seeing that intellect is only one special mode of a specific function and a product of evolution, not a quality or character of the living source or ground of evolution.

The attribute of benevolence, on the other hand, applied to the activity of life in evolution is not only at variance with the fundamental character of evolution, but is in plain contradiction with the facts. The attribute of infinite goodness attached to the idea of God in the old theology was a necessary accompaniment of omniscience, for perfect understanding was only consistent with good will. Hence the problem of the theodicies, namely, how are we to explain physical evil, pain, in a universe which is the creation of an omniscient designer; and how are we to reconcile the

toleration of moral evil, sin, in a realm of rational spirits dependent on an infinitely good ruler? The old theology could envisage no other end of creation than that of the happiness of individuals, and its whole scheme was dominated by the conception of the soul and its destiny. In the evolution theory, on the other hand, souls are of no account. The most insistent feature of the life activity which we conceive as the ground of evolution is the instrumentality of individuality. Life is completely indifferent to the individuals in which and by which its impulsive activity is borne along. It is as though individuality were only a means, and as though individual organisation were subservient to an end which was realising itself in despite of the individual. Pleasures and pains are not rewards and penalties; they are spurs which direct the activity of the individual, forcing it towards ends which are not individual ends. Pain is as direct and purposive a product of evolution as pleasure. The problem of physical and moral evil is transformed, therefore, in the evolution theory to the problem of individuality itself. It is the lavish production of individuals which entails the misery of the struggle for existence and the adaptation of species to prey on one another. The inherent harmony of nature, the placid face which it presents to our aesthetic contemplation of it, is no more than a temporary equilibrium of unstable, tumultuous, ceaselessly warring forces. There is no benevolence in the life principle in the meaning of the old theology. Life endures by existing or actualising itself in infinite modes of individual activity, but it sacrifices individuals as ruthlessly as the commander, attentive only to victory, sacrifices the lives of his soldiers for his goal. It is, then, the facts of existence

which prevent our attributing benevolence or goodness, either in a human or in a transcendent meaning, to life.

Are we precluded, then, from identifying the life which we conceptualise as the source and ground of our being with the philosophical idea of God? We should be were it impossible to set against these depressing aspects of evolution other aspects which give support to a faith, a hope and a charity. The fact is that the gloom which overshadows the first acquaintance with the evolution theory is due to its contrast with the lost ideal of a God peculiarly and predominantly interested in the destiny of men created by him in his image and recipients of his grace. When God is de-anthropomorphised, then only does the moral grandeur of man appear in its true proportions. This was seen for the first time and with wonderful intuition by Spinoza.

There is, however, a preliminary question which must occur to everyone who reflects on this problem. Is this identification of the universal life principle with the idea of God either necessary or even justifiable? Why may we not regard life as the abstract universal of the particular phenomena of living organisms and reserve our idea of God for the source and origin of life? It may indeed remove God further off from our immediate interest and may even make his existence more inscrutable, but this is the effect of all progress in scientific generalisation. Many have argued and will continue to argue that the evolution hypothesis, if true, leaves the problem of ultimate origin unaffected and does not really touch the interests of religion. This is an impossible position for all who are sincere in the interpretation of evolution and thorough in their acceptance of its implications. There is for them no

choice in the matter. If evolution is fact, a force is working in and through our individual lives which unites us with all the living, and which specialises in us the mode of our individual existence. We must be reverent towards this vaguely defined yet clearly apprehended source of our being, for we have come to consciousness of it, though we cannot personalise it, or discern its origin, or fathom its nature, or conceive its goal. It is the most real of realities, yet it will not adapt itself to our human frames of images and concepts. We know only that its reality is our reality and that in it lies the whole secret and mystery of existence. It is immanent in us and it transcends us. What is this but the reality which philosophy has named God? In the immanent presence of this living God, what folly to fashion for ourselves a golden calf and proclaim, "These be thy Gods, O Israel, which brought thee up out of the land of Egypt"!

When we turn, then, to consider the bearing of the evolution theory on the idea of God, we find ourselves brought to the identical position of Spinoza's fundamental conception, with a sudden illumination of that wonderful idea. Spinoza conceived God as the universal substance manifested under two attributes, thought and extension, and existing in infinite modes. It was a static conception expressed by distinguishing existence *sub specie eternitatis* from existence *sub specie temporis*. The passage from eternity to time constitutes the great difficulty of Spinoza's idea as an interpretative principle. The one substance is eternal, and infinite, and unconditioned; nothing falls outside it, and the modes are determinations within it, on the analogy of waves on the sea. The evolution theory invites us to form a strikingly similar scheme of an interpretative philosophical principle. Life is the sub-

stance, source, ground, fundamental identity of all forms of living activity. It manifests itself in a continuous evolution of two completely disparate and yet essentially complementary factors, material structure and spiritual function, the attributes of extension and thought, and existing in inexhaustible modes of individual mind-body organisations. The principle of evolution being, moreover, a dynamic concept, the unity is the unity of a process and not the unity of a state.

Here we may anticipate an objection. Why, it will be asked, should we select the principle of life rather than any other scientific universal for the apotheosis? From the biological standpoint life and its whole evolution is an isolated and partial and conditioned phenomenon. It is as circumscribed as any other class or group of natural phenomena, such for example as electro-dynamics. The idea of God is the concept of a comprehensive reality. It is the idea of a supreme being, in relation not to a single process like life but to the universe as a whole. This is true, and our identification of life with God would clearly be impossible if it implied the exclusion, or the rejection, or the suppression of that part of the universe which is non-living. This is not the meaning. What we are insisting on is that in the concept of life we have the concept of a concrete existence such as no other principle supplies. Life in its full meaning includes materiality and mentality, and no other concept does. As studied in biology it is an abstract concept like the concept of magnetism or of electricity, a class name for a group of particular phenomena, but to philosophy it offers the basis of a metaphysical construction. The concept of an inexhaustible activity manifesting itself in a process of creative evolution enables us to conceive an all-

embracing dynamic reality, a God who is not a fanciful or fantastic harmony of inconsistent attributes, but God manifested, the God in whom we are and whom we know because he is God in us.

It cannot be denied that it is impossible to identify the idea of God which arises from the theory of creative evolution with "the God of Abraham, of Isaac, and of Jacob." When Pascal turned from the abstract, syllogistically demonstrated God of the philosophers to the God who was revealed in the close bonds of a personal relationship, he was not rejecting a false idea to embrace a true one; on the contrary he was verifying the philosophical concept by the experimental test of his own living experience. For us the task is other and harder. It is the philosophers' God which evolution has called upon us to re-form, and it is the consequence of this new concept for personal religion which is of supreme importance to us. The conception of our relation to God is profoundly modified. This is inevitable. Allegorise as we will the mythology of the Christian or of any other religion, we are confronted with the fact that the theory of evolution has completely altered the basis of the traditional religious concepts and antiquated the venerable superstructure. No amount of genuine admiration for the intellectual eminence, moral force, saintly lives and courageous self-devotion of the founders and apostles of the great historic religions can disguise the fact that our modern conception of man's origin, and of the progressive creative evolution which has determined his present commanding position, has rendered obsolete the whole class of ideas on which their teaching was based.

Before we attempt to indicate the ground of a possible religious attitude in the idea of God which evolution suggests, let us look at the change which the new

theory has brought about in its broad outlines. The outstanding fact in the moral aspect of our lives from the evolutionary standpoint is that the value of our individuality is not intrinsic, but instrumental. Individuals, generations of individuals with their narrowly finite ranges of activity, are the means by which an activity which is one and universal progresses. This is the most pronounced difference between the old concept and the new. Individuality is the mode by which a creative evolution of life works, the means by which it sustains itself and continues its process. Yet it is equally evident that individual experience is not the goal of evolution, and the happiness of individuals is not its concern. Life is lavish of individuals and indifferent to their fate. Even the independence which individuals enjoy, and the freedom they exercise in their activity, appear from the evolutionary standpoint as a means, not as an end. Symbiosis seems a principle of life, manifesting itself in its lowliest forms of activity, and in its higher forms sexuality limits the independence of even the separately organised individuals. An individual man who comes to full self-consciousness, who realises his responsibility, who affirms his dignity, has to recognise that his confidence and self-sufficiency are only an appearance, and this very appearance of self-possession is a product of evolution, a means to an end. And this end, not only is it hidden from him, but its concealment is designed to make its accomplishment the more effectual. This relation of man to his creator is as opposite as the poles from that to which the religions have given expression, and the old myths are not only singularly inappropriate to symbolise the new idea, but they rest on total misapprehension of the facts. No ingenuity will harmonise with the theory of man's evolutionary

origin the myth that God planted a garden in Eden. All the familiar similes which have seemed the natural expression of man's dependence on and relation to God are inapplicable and contrary to the theory of evolution. God is not the potter fashioning vessels of clay, the father rejoicing in the return of the prodigal, the good shepherd, the righteous judge, the ruler over spirits made perfect. We must part with these cherished idols of the imagination if we accept the principle of evolution with its implications. The statically perfect God of the ontological argument and the omniscient providence of the teleological argument must give way to a new dynamical idea of God. Such is the loss; let us look now at the gain.

Evolution as we are now regarding it is present fact. By calling it creative we mean that it is not a past event from which certain mechanical dispositions have ensued. Such was the original hypothesis. It was assumed that at some remote period in the past history of the planet a new chemical compound exhibited novel characteristics, that the evolution of living forms in a continuous development was the consequence, and that the present flora and fauna of the earth had been brought about by this mechanistically conceived process. This theory, though it came into conflict with the traditional belief in special creation, involved no necessary change in the theological idea of a personal creator; it only varied the general conception of his *modus operandi.* Creative evolution, on the other hand, is the theory that all actually existing living forms of activity are the present realisation of a universal dynamic activity, manifesting itself as an urge or impulse or striving, not only one in its origin, but also one in the full extent of its multifarious process. It is this new conception of life as a dynamical prin-

ciple, in contrast to the traditional view of life as a quality or an accompaniment of complex molecular combinations, which impels us to form a new concept of God and of his relation to us.

The idea of God which emerges from the conception of creative evolution is vague and formless. In the consciousness of our own finiteness, and in the perception that our knowledge is relative to our actions and that our actions are restricted in form and limited in range, there arises the idea of an encompassing existence from which we derive the spur and direction towards defined actions. Our experience seems to indicate an impelling force of external origin, a striving which is causing us to strive. We can fashion no likeness of it, not because to liken the supreme being to some earthly shape savours of sacrilege, but because man himself with all his furniture of aesthetic imagery is only one mode of this divine being. In contrast, therefore, to the God of the ontological argument whose idea includes existence, the God of creative evolution is existence which refuses to be comprehended under any idea.

It may seem like mockery to suggest the possibility of a religious attitude towards a God so conceived, more especially so when we take into account the aspect of ruthless conflict which the living world presents to us. It seems like inviting us to worship the God of battles while the carnage is in progress and the issue undecided. Indeed is not this exactly the position in which humanity finds itself—before it always the idea of peaceful enjoyment, actually engaged in unceasing strife? Is our new religion to reconcile us to the perpetuity of the conflict, to the never-ending struggle of races, to the ceaseless competition between groups and individuals? Do we love peace? We cannot enjoy

it and live, because it is not we as individuals who decide, but an encompassing power striving in us and through us for ends which are not human ends, and for which human ends are only a means.

All religions have had to reconcile the fact that man's life is an unceasing struggle, that human faith and hope are delusive and human ends unsubstantial. Every religious attempt to solve the problem has taken the form of idealising a state of existence the direct contrary of actual existence. If religion has fashioned God in man's image it has consistently ignored what is actual in man and all the conditions of actuality. It has sought to rationalise the ideal of human desire and substantiate it by faith. "Now faith is the substance of things hoped for, the evidence of things not seen." "These all died in faith, not having received the promises, but having seen them afar off, and were persuaded of them, and embraced them, and confessed that they were strangers and pilgrims on the earth." All religious attempts without exception have failed completely to give intellectual satisfaction, however successfully they may have responded to man's emotional nature. All have appealed to faith and when called on to give a reason for this faith have adduced moral arguments, singularly deficient in scientific support. It is in the light of the theory of creative evolution that the traditional religious interpretations are seen to be fantastic and to miss the whole significance of the actual facts. The main positive defect in the religious idea of God is that, in conceiving God, we endow him with our sense-selected apprehension and with our rational conception, with the only difference from ourselves that both these theoretical modes of knowing are raised in him to an infinite degree of perfection. The justification of the idea is the assumption

that our rational nature is God's nature imparted to us. If on the contrary human nature, in every aspect of it, is the outcome of evolution, it is impossible that the creative life, which has developed in man his intellectual mode of activity, can be itself only a higher degree of human nature, or itself act only in the human mode. In all its essentials this was the thought of Spinoza. For him this enlightenment as to the nature of the relation of the finite modes to the infinite substance furnished the clue to an ethical theory, and it is an ethical theory which the new idea of evolution is demanding of us.

CHAPTER VI

EVOLUTION AND THE MORAL LAW

Kant was the first philosopher to place the moral law on the same basis as the laws of nature and apply to it the same interpretative principle. In the often-quoted passage which concludes the *Critique of Practical Reason* he expresses in a striking manner the antithesis and the complementary character of the two orders of fact. "Two things fill my mind with ever new and increasing wonder and awe the oftener and more steadfastly I engage in reflection on them: the starry heaven above me and the moral law within me." The independence of these two orders was the problem of his speculation, their relation the clue to his solution. Nature in its reality is independent of the frames of sense intuition and of the categories of the understanding to which it conforms, and mind which imposes laws on nature itself conforms to an inner law, a categorical imperative. In this moral law Kant found the fact of experience which gave reality to the ideas of reason, concepts of things-in-themselves which are not possible objects of knowledge, but which are required to rationalise our rules of action. The soul, the world as unconditioned, God, are not sense-intuited objects nor known by intelligible concepts, but they are necessary postulates of our practical reason.

The moral law, the conception of a rule prescribing to the human agent what he ought to do, regardless of his natural inclination and of any immediate in-

centive to gratify natural appetite, often in direct opposition to his individual desires and interests, has always seemed to indicate something in humanity which has raised it above mere animality and endowed it with spirituality. It has made the rationalising nature of man's activity appear as a second nature imposed upon man's animal activity, and by its divergent tendency and contrary disposition has set up a continual warfare within the individual. This has been expressed in religion in many mythical interpretations, behind all of which is the idea of a direct relation between God, the source of existence, and man constituted by the gift of reason a responsible agent. This idea of the two natures took definite form in the philosophical speculations of the seventeenth century, more especially in the theories of Pascal and Malebranche, and also, though in a somewhat different sense, in those of Leibniz. Kant treated the problem of the moral law in a wholly original way and with the same critical method which he had applied to the laws of nature. He recognised as a fact of experience that the individual agent finds within himself a command to act in a way not prompted by self-interest, a peremptory order which he will disobey at his peril. He asks how this fact is possible, what are the *a priori* conditions of the possibility of such an experience, precisely in the same way as in the *Critique of Pure Reason* he had asked how physical science is possible. He does not argue from the fact of the moral law to the existence of God and the immortality of the soul; his argument is that the moral experience is only possible on the condition that there exists a moral order in the universe, and a soul in man not subject to the vicissitudes of the body. The moral law consequently postulates God and immortality, although it does not

in any intelligible sense reveal them as objects of knowledge. The moral law, therefore, postulates those very noumenal realities which in the *Critique of Pure Reason* were found to be impossible objects of knowledge.

Kant's whole conception of the moral law, and the ground of his never-ceasing wonder at the presence of this law within him, lies in the recognition of the importance of the individual as a responsible agent. All action is individual action, both in its ideal initiation and in its actual performance. It seems impossible therefore to explain disinterested action on ordinary scientific principles. Yet there is nothing supernatural in ethical action. It appears indeed in its first intention as purely irrational action, and it seems as though in order to rationalise it we must discover some ulterior individual end to which it is directed. The *a priori* condition of the possibility of a science of nature Kant had already shown to be an objective material which the mind in apprehending adapts to the frames of sense and understanding, and in his moral theory the *a priori* condition of the possibility of a science of mind is the existence of a realm of ends. In other words it appeared to Kant that natural science required him to conceive an objective world such as Newton had assumed, ethical science required him to conceive a spiritual hierarchy such as Leibniz had assumed.

The naturalistic ethics of the nineteenth century found itself in a similar dilemma. It had to find within the individual the incentive to disinterested action. It sought to do so by first differentiating individual purposive actions into egoistic and altruistic, and then explaining altruistic actions as the result of an enlightened egoism. It was along this line that Herbert Spencer discussed the problem in his *Data of*

Ethics and claimed to have succeeded in bringing ethical action within his scheme of a philosophy of evolution.

The problems connected with ethical action all arise from the consideration of the importance of the individual. For science the individual in his definite psycho-physical embodiment is the only possessor of experience, and all real agency, all incentive to action, all performance of action, all ends of action, are real only in their reference to individual experience. All value exists only in individual enjoyment. It is true that individuals are organised in groups, societies, families, tribes, nations, political parties, trades unions, churches, and that far the greater proportion of all actions is concerned with these relationships of individuals, but all concerted action is the action of the individuals associated. It is true that there arises out of the association of individuals the idea of a universal reality. We refer to it sometimes as the group mind, sometimes as the general will, but all efficient action, even in carrying out a general will, is individual action. The fact appears self-evident. Whatever be the status of the mind and whatever be the means by which minds communicate, we know only one means by which ideas are continued into actions, and that is the bodily organism. If there be a group mind over and above the minds in the group, a general will distinct from particular wills, there is no group brain and there is no general body distinct from particular organisms. All common action is reducible, so far as efficiency is concerned, to the actions of unit individuals joined in association for a common purpose. Ethical action appears, therefore, as though it must look for its interpretation to individual psychology. The ethical problem has become in consequence the at-

tempt to discover the origin of the social and political ends, which presuppose the subordination of individual interests to the common interest, in the psychical dispositions of individuals who are primarily purely self-centred subjects of experience.

This conception of the primordial importance of the individual is completely subverted in the scheme of existence which the theory of evolution presents to us. The most striking feature of the aspect of the living world regarded from the standpoint of creative evolution is the subordination of the individual. Individuals are a means, not an end, of evolution. It is true that individual existence is the only mode in which life is actualised, but wherever a specific form and definite range of living activity is attained by the universal principle of life the actual individuals count for nothing. They are produced lavishly without any special providence in regard to their fate. The only concern of the life urge is that the supply shall not fail. It is strange and even paradoxical, for to our view every individual, besides the marvelous ingenuity of its organic construction and the amazing directness of its function, sums up, actualises and carries forward and onward a limitless and inexhaustible history. Every individual is the possessor of the heritage of an unbroken ancestry forming a continuous series, the beginning of which we find transcends our power to imagine or to conceive. Not only is this heritage the possession of every living individual; it exists potentially in the germs which never attain to actual individual existence. It seems impossible to us, therefore, to appreciate any end which is not either directly or indirectly an individual end. Evolution forces on us the fact that, whatever be the end of the individual, the individual is the means to an end which transcends indi-

viduality. When this fact is appreciated, the ethical problem is seen to be fundamentally changed. For in the first place the whole difficulty in accounting for disinterested action disappears, because the incentive and goal of all individual action is not in the individual, but in the life-urge which is actualised in the individual. If the individual appear to be spurred to activity by individual cravings seeking individual satisfaction, these very cravings are a product of evolution to secure the efficiency of the individual as a vehicle of the life process. In the second place there arises an entirely new moral problem, and that problem is twofold. It is theoretical and it is practical. The theoretical problem is to determine from the scientific aspect of evolution what precisely is the value of individuality, that is, what from the universal standpoint of the life-urge, which has created us and determined the form of our activity, is the responsibility imposed on us as individuals. And the practical problem is to know what use we can and ought to make of the freedom with which our individuality endows us.

Wherever we look, throughout the whole realm of living activity, the most salient feature of the form of this activity is the organisation of independent, self-centred structures, functioning automatically in response to the varying conditions of their particular environment. These organisms, besides their own life histories, possess the power of reproducing themselves, that is, of generating a new organism repeating in essentially identical circumstances the essentially identical life history of the parent. The variation of individuals, for besides essential identity there is actual variety, appears to arise from the sexual relation, which is an internal relation of individuals within the species. Sexual reproduction seems universal, for even

in the unicellular organisms it is only in degree that sexual distinctions are simpler than in the complex organisms of the higher forms. Sexual reproduction entails a selection, and it is this selection, however effected, and whether it be purely haphazard or whether it be in any sense purposive, which accounts for such difference as exists between individuals of the same species, and which prevents one generation being the mechanical repetition of another. With this qualification it seems to us when we survey the living world that, wherever a species has become established, it consists of individual organisms, without any external material bond to establish continuity between them, produced from one another, true to type, and repeating indefinitely a definite range of activities. Nowhere does nature manifest any special providence exercised for the individual as individual. The consoling words of the gospel: "Are not two sparrows sold for a farthing? and one of them shall not fall to the ground without your Father. But the very hairs of your head are all numbered. Fear ye not therefore, ye are of more value than many sparrows," find no support in biology. The sparrows of this year are a repetition of the sparrows of countless years which are past, and each succeeding season has witnessed the birth of an immense surplus of individuals. And yet individual sparrows, enjoying the functioning of their adapted structural organisms, seem to be not only the only form in which sparrow activity exists, but the end for which life so far as sparrows are concerned has evolved. The only alternative would seem to be that life has evolved sparrows for the sake of, or at least as one of the means of existence of, hawks and owls. If the enjoyment of its individual activities is not the end towards which the sparrow's evolution is directed, but

something we may designate sparrowness, for which individualisation is a means and not an end, and for which the fate of actual individuals is indifferent, so long as the supply of individuals is adequate, then it is difficult to give any positive shape to the life purpose which has found expression in the evolution of sparrows. All we shall be able to say is that negatively what life is securing by the individual sparrow's enjoyment of its activity is the perpetuation of sparrow activity within the range to which it is adapted. The problem is a peculiarly baffling one. What is true of sparrows is equally true of human beings. Individuality is the one and only form of actual existence, and yet individuality, which is essentially discontinuous, is only valuable so far as by succession of generations continuity is secured to it.

Still more striking is the subordination of the individual in the activities of the social insects. The activity of the hive, the activity of the ant heap, is the activity of individual units each with a completely independent structural organisation, yet functionally directed to an exclusively social end. Structurally the individuals are adapted to their part in the common life, yet the union and integration of individual activities is not effected by any material bond—at least there is none which we can discover—but solely by psychical subordination of individual appetites to fulfil the common purpose. This supra-individual goal of individual activity is not a result of free association, but of creative evolution. Evolution has not stopped at the individual. In the bees and ants there is disclosed a goal beyond individuality, a goal which entails the sacrifice of the individual though retaining individuality as an essential factor. The nearest analogy is in the principle of vital organisation itself, in which the indi-

viduality of the component cells of an organism is completely subordinated to the integral function of the higher individuality which the organism itself represents.

When we come to consider man himself in his full activity as a product of living evolution we are presented with a phenomenon which, at any rate in its first aspect, is absolutely unique. Human culture, manifesting itself in political institutions, in art and science, in religious beliefs, in philosophy, is different in kind from anything we meet in other forms of living activity. It leads us when we come to man to differentiate between natural law and moral law. The moral law appears to be a human by-product, that is, it does not appear to be dependent on the living evolution which has developed the neo-pallium and determined in structure and function the nature of man's action, but on the freedom with which the intelligent or rational mode of conscious activity has endowed the individual.

The problem of the moral law, taking the term to include all that we mean by distinctive human culture, is the question how far, directly or indirectly, it is the outcome of creative evolution. Scientifically we have clear evidence that the efficient functioning of the human organism, the efficiency which has enabled man to become an inventive animal; a tool-making, provident, animal; a rational, free, deliberating animal, is the outcome of a progressive evolution of the neo-pallium. But can we suppose that in evolving the neo-pallium, life purposed (to speak anthropomorphically) and had in view the actual political, social, aesthetic, religious, culture which man has thereby achieved? Can we suppose that not merely man's natural organism, but also his civilisation are the out-

come of evolution in the same sense as the hive and the ant heap?

At least two alternatives exist. One is that freedom of individual action may be an illusion of the individual. The life-urge may be acting in and through us in an analogous way to that in which the grace of God according to the Augustinian doctrine accomplished the work of salvation, by making the elect seem by their own free act to acquire the saving faith. It would not follow that human institutions and not human lives are the direct goal of the life-urge, but it would mean that human individuality including all its works exists only as a means and not as an end. The other alternative is that freedom with its unforeseen and unforeseeable extension of the range of activity is the predominant end towards which life is striving. In this case the success of the evolution which has produced man is measured by the freedom with which as an individual he is endowed.

Before examining these alternatives it is important to note that, in speaking of freedom as a character of human individual activity, I am referring to a fact and not propounding a theory. There is no need to raise the philosophical problem of free will; the freedom I am speaking of is simply the range of individual activity which obviously differs, quantitatively and qualitatively, throughout the whole hierarchy of living forms. Man has a range within which his action is unrestricted, and also there is a limitation of this freedom. Man is free in just the same sense in which a fish is free and a bird is free. Man also is restricted just as a fish is confined to water and a bird to air.

The ethical problem in the light of the evolution theory is therefore primarily to determine how far the free activity of the human individual is over-ruled by

a life-urge directed to ends which are not the ends of the individual; or, how far the free activity of the individual is itself the end towards which evolution is working. In the one case freedom in the sense of real initiative must be illusion, and freedom in the sense of a power to vary or modify the direction of the life-urge can be actual only to the extent to which the life-urge is actualised in the individual. There are two ways in which it is possible that the appearance in man of an intentiveness not possessed by other forms of living activity may be deceptive. First, it is possible that we are by nature disqualified, prevented by our constitution itself, from appreciating the universal aspect of the individual motives of our actions. The distinction we make between the natural law and the moral law may be purely due to, may perhaps be a function of, the finiteness of our individuality. In this case we are deceived in thinking that reason and the moral law, the exclusive possession of humanity, imply real freedom and responsibility. There is also another way in which we may be deceived. It is possible that reason and the moral law, which seem to us absent from the forms of finite individuality below the human, are present in them in some mode, and that our failure to discover them is the effect of a natural disability to enter into other modes of activity, or to discern the plane on which in them reason functions. Were the human mode of activity made an object of contemplation to a being occupying a supra-human standpoint, and were the whole range of human activity apprehended by him so far as it is expressed in structure and function, even then, unless the peculiar significance of the movements of articulation by means of which our reason is discursive were also apprehended, the contemplating spectator would be unable, by a

natural disability, to discern the plane of human free activity and its spring. Such may conceivably be our case in regard not only to creatures similar to ourselves in organic type, but even in regard to all forms in which life activity is individualised. For my own part I can think of no actual test by which a problem such as this could be solved. On the other hand it does seem to me that if we are faithful to the principle of creative evolution and accept its implication, if we identify the universal principle of life with God manifest in creation, we cannot with any show of reason suppose that the final goal is reached when a certain type of individuality has appeared, the particular characteristic of which is freedom, in the literal meaning of the term. We cannot think that man, the outcome of evolution, is liberated to work out his own destiny, is become himself as God, knowing good and evil.

What it comes to is that, if we are true to the principle of evolution, we cannot separate man from his works, humanity from human culture, the body from the mind, the mind from its world. The antithesis of the natural law and the moral law falls within human nature; it is not an antithesis between man and the reality external to him. Man has not been evolved for the sake of human individual ends, and these human ends are not the ends beyond the individual to which the life-urge is directed. Man in his whole undivided nature, man in the full range of his activity, is not the *fait accompli* of a mechanical evolution, but an expression and actualisation of God. The God of creative evolution neither slumbers nor sleeps. Evolution is not a succession of states; it is activity in being.

Are we not, then, if we accept this interpretation of evolution, confronted with a terrible dilemma? Either we must conceive a God who does not accord with our

moral ideal, or else, we must degrade our moral ideal to the status of a mere utility product of evolution to be cast aside when it no longer serves its purpose. Evolution in every aspect of it gives us the impression of a force behind it, relentless, ruthless and cruel. Tennyson's often-quoted indictment of "Nature red in tooth and claw" does not exaggerate the dismay with which a truth-loving yet reluctant generation first received the theory. In philosophy, also, Nietzsche conceived his superman as one who had attained a position beyond good and evil, disdaining the restraints of the moral law as the bondage of slavery. At the outbreak of the Great War there were many who saw in the ruthless methods advocated and adopted the working of that very principle of evolution which in the struggle for existence exercises a natural selection and secures the survival of the fittest. It is a depressing thought and has led many deeply distressed minds to the conclusion that, if evolution be a fact, we had better for our own sakes sidetrack it as best we may. To identify its principle with God, to suggest that it may conform to a moral law loftier and nobler than the human ideal, is to them horrible, setting up an altar to Moloch in his most inhuman form.

Before we examine this charge, there is one very general interpretation of what is called the struggle for existence which involves a complete misconception of the principle of evolution. The struggle is often, perhaps generally, conceived as a warfare or strife of the same nature as human conflicts, when nations strive for supremacy or individuals indulge in vendettas. The struggle for existence is nothing of the kind. When animals prey on one another, as the carnivora on the herbivora, the hawks on the finches, the owls on the mice, it is not because the life principle has set

enmity in the nature of the predatory and met it with guile in the nature of the prey. By this I do not mean merely the commonplace that it is only in a metaphorical sense that the wolf is cruel and the lamb innocent; I mean that the true analogy is not between the heartless strong man and his helpless victim, but between man and his food, between the creature and its means of subsistence. We do not find one species struggling with another to dispossess it and occupy its place. The struggle for existence is a descriptive phrase applied to the whole scheme of evolution. The lavish production of individuals of a species provides the means of subsistence of another species adapting itself to find in the former the necessary food. Even between individuals of a species there is no struggle in the meaning that individuals contend as to which shall have the subsistence where there is enough for some and insufficient for all. The disappearance of the red man in America is not a result of warfare, nor consequent on the indiscriminate massacre of a weak race by a stronger one; it is simply the consequence on the one hand of the spread of white civilisation contracting the hunting grounds, and on the other of the comparative helplessness of the superseded race to adapt itself to altered conditions. It is not the gladiatorial arena, but the beautiful gospel parable of the sower which gives us the true picture of the struggle for existence: "Behold, a sower went forth to sow; and when he sowed some seeds fell by the wayside, and the fowls came and devoured them up: some fell upon stony places, where they had not much earth: and forthwith they sprung up, because they had no deepness of earth: and when the sun was up, they were scorched; and because they had no root, they withered away. And some fell among thorns;

and the thorns sprang up, and choked them; but others fell into good ground, and brought forth fruit, some an hundredfold, some sixtyfold, some thirtyfold." Life is the sower and individuals are the seed. In the natural course of things a species meets with the conditions which correspond to its needs. It is abundantly fruitful, producing individuals to the full capacity of the environment, and beyond its capacity. The species is kept in check by the other species which manage to establish with it a more or less durable equilibrium. There is nothing whatever in the scheme of creative evolution to support the view that warfare in the human meaning—the hand of every man against his brother—is the natural law of evolution or the mode by which its progressive ascent is assured. It is true that human civilisation has changed the aspect of nature, that where man establishes himself certain types of fauna and flora disappear, but this has not been effected by preliminary extermination; the civilisation of the area has itself rendered the territory unfavourable to the old, favourable to the new. The God of evolution does not enjoin on his chosen people the destruction of the Canaanite as the condition of entry into possession of the promised land. No destroying angel flies in the van of progressing evolution to prepare the ground for the new order; the old is abandoned as an encumbrance only when it is outworn.

We now come to the point which is really crucial. The theory of evolution requires us to conceive our reason, and the moral law with all its meaning in the human mode of existence, as themselves the outcome of evolution. This is an entirely new standpoint for philosophy. It implies that the force expressing itself in evolution, the activity in itself which we identify

with God, is supra-rational and supra-moral. To endow God with reason and good will is to fashion an image of the Creator in the likeness of one limited mode of one limited form of activity in which he is expressing himself. It is perfectly true that our principle precludes us from forming a definite concept of God, but also it shows us that it is puerile to discourse on God's attributes as though he were mere superman. It is equally foolish to argue from the human aspect of evolution that it is the expression of a non-moral or even immoral force. The force which has produced man with his moral nature must itself transcend morality. We are conscious of God as present in us in our consciousness of our own actual being, but God's existence transcends our finite individuality and refuses to take shape under any category of thought.

Every religion has conceived God as the perfection of what appear to man the highest attributes of human nature—rational discourse and disinterested good will. In endowing God with these attributes we have come of necessity to regard their presence in man as the divine nature bestowed on man by God, expressed in the myth of the creation of man in God's image. The philosophical concept of God, to which the scientific principles of evolution lead us, is not and cannot be framed on these lines. To project from ourselves a personality and clothe it with infinite attributes conceived in the mode of our finite activity is inconsistent with the conception of our individuality as a stage in the progressing evolution of a specific and conditioned form of existence. Why not, then, abandon the attempt to conceive God? Why not be content to recognise the unknown and unknowable? We cannot. The very condition of knowing ourselves is that we idealise the activity which in transcending our finite

individuality universalises our reality. Could we divest ourselves of the intuition of our dependence on God we should of necessity appear to ourselves as the baseless fabric of a dream.

Let us now consider the practical aspect of this ethical problem. How ought we to conduct our lives in conformity with this new conception? I myself seem to find the answer ready for me and clearly indicated in Spinoza's expression, "the mind's intellectual love towards God" (mentis amor intellectualis erga Deum). I am not concerned to expound Spinoza's meaning, but the expression seems more fitted than any I can think of to convey the ideal of human individual conduct in the light of the theory of evolution. The word "intellectual" must carry for us a significance which it had not for Spinoza, because it can only refer to the human mode of apprehension and in no way determines the character of God. Spinoza's doctrine has been interpreted in a mystical meaning, but if we take his words literally his doctrine is the antithesis of mysticism as exemplified in the Christian mystics. It was by emotional love and not by intellectual love that they felt themselves encompassed by and absorbed in the divine substance. Let me, however, try to interpret the way in which I understand the mind's intellectual love towards God.

If we apply the gospel command: "Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind. This is the first and great commandment. And the second is like unto it. Thou shalt love thy neighbour as thyself," to our new concept of God, it can only be by recognising our human nature and our human mode of activity as expressing definitely to us the purposive activity of life. We cannot look through and beyond our human nature to some

other and, from the universal standpoint, perhaps higher, mode of activity. Clearly, then, if we realise the nature of our dependence and would bring ourselves into accord with the ascending striving of life, it can only be by setting before ourselves the ideal of a perfected humanity and conducting our lives in accord with that ideal. Once we have grasped the falsity in theory and in fact of that first aspect of evolution which presented to us the spectacle of an eternal warfare, a strife for mastery ruthless of methods, every man's hand against his neighbour, injustice enthroned, recognising no right which is not founded on might, it becomes evident that in working for an ideal humanity we are putting ourselves in accord with evolution, and not, as some believe it, vainly rebelling against it. To realise this in our individual conduct and in our life purpose is, therefore, what I mean by the mind's intellectual love towards God. This is not setting up an ideal humanity in the seat of God and raising an altar to it as the positivists have done. No man is asked to substantiate an illusion or practise a self-deception. The clear light of reason which shows us the human intellect as a mode of activity shows us also that we are working with God when we work for the perfecting of this human mode.

If there be one thing which more than another marks the character of the life principle of evolution and to which there appears nowhere an exception, it is the subordination of the individual to the general good. There is not throughout the whole range of evolution the slightest indication that the individual satisfaction of individual cravings has any part whatever in the evolutionary schemes. If this be so, the intellectual love towards God must carry with it the

acquiescence of the individual in the merging of his individuality in humanity. This I take to be the distinctive mark of evolutionary ethics.

The ethics of evolution, therefore, accepts the moral law as natural fact. It is the expression in the individual of the universal life principle which is working through and by means of the individual for an end beyond the individual. The ethical attitude is intellectual, not emotional. The moral law does not strike the evolutionist philosopher with awe and amazement and require him to postulate Ideas of reason in order to rationalise its working. The reason for this is that the principle of evolution is not individualistic. We have not to deduce ethical conduct out of individual self-conscious sense experience with pure pleasure-pain incentives to action. The universal end is present from the first and throughout.

On the other hand evolutionary ethics does not assume a fatalistic attitude to the individual. The fact that individuals exist as a means and are the vehicle of a force which does not, perhaps cannot, reveal its origin or destiny to the individual consciousness in which it is actualised does not justify a stoical indifference on the part of the individual. The indifference of life to the individual does not mean that a higher power is using individuals as pawns or ciphers in a game in which the individual as individual plays no part. Life itself exists only in the individuals who are carrying out its activity.

Lastly, evolutionary ethics does not reduce freedom to illusion. Freedom is not a power of rebellion. The meaning of freedom is that as individuals we are embodying and carrying out the universal life principle. Life is a creative and inventive activity. We are its

embodiment; it is therefore in us and in our individual activity that its freedom is actualised. The imperative which evolution enjoins on the individual is grandly rendered in Montaigne's motto: "*Fay ton faict et te cognoy.*"

NOTE.—The passage in Spinoza referred to in this chapter is *Ethics*, Part V, Proposition XXXVI: "Mentis amor intellectualis erga Deum est ipse Dei amor, quo Deus se ipsum amat, non quatenus infinitus est, sed quatenus per essentiam humanæ mentis, sub specie æternitatis consideratam, explicari potest; hoc est, mentis erga Deum amor intellectualis pars est infiniti amoris, quo Deus se ipsum amat."

To this there is appended the corollarium: "Hinc sequitur, quod Deus, quatenus seipsum amat, homines amat, et consequenter, quod amor Dei erga homines, et mentis erga Deum amor intellectualis, unum et idem sit."

And in a Scholium he says: "Ex his clare intelligimus, qua in re nostra salus, seu beatitudo seu libertas consistit: nempe in constanti et æterno erga Deum amore, sive in amore Dei erga homines."

CHAPTER VII

LIFE AND KNOWLEDGE

In Paris in the year 1691 there was published anonymously a small book, a duodecimo of three hundred pages, entitled *Voiage du Monde de Descartes.* It was a satirical skit on Descartes' *Principles of Philosophy.* The author proved to be a learned and witty Jesuit priest known as Father Daniel. The Cartesian philosophy was then at the height of its influence and popularity, and the physical principles of Descartes were generally accepted and practically unchallenged in science. Descartes himself had been dead for more than forty years, but Malebranche his philosophical successor and continuator was then in his prime. Malebranche was engaged in a lengthy and bitter controversy with the great Arnauld, now in his old age, concerning his metaphysical doctrines, but the chief interest of this discussion was theological, and it dealt with questions of orthodoxy. Newton had already published the *Principia,* in 1686, but as yet there was no sign of the revolution it was going to effect in physics. Leibniz had challenged Descartes' system in a crucial point, the indestructibility of movement, but Leibniz's influence on philosophy counted for little until the middle of the eighteenth century, when the publication of the *Nouveaux Essais,* fifty years after its author's death, drew general attention to his extraordinary genius. Cartesianism was the prevalent philosophy of the day when Father Daniel satirised it in his book.

The fiction the author employed was that Descartes had not, as was supposed, died in Stockholm in 1650, notwithstanding that he had been interred with due funereal pomp; he was in fact still living, still pursuing the studies of the principles of philosophy he had discovered, and still anxious that his theories should be triumphant and gain adherents. What had really happened was that, making use of his discovery that soul and body are independent, he had found means of disencumbering himself of his body and had left it for awhile untenanted. This had given rise to the idea that he was dead, with the unfortunate consequence of his funeral. The author then relates how he found a guide prepared to conduct him through the universe and bring him to the great philosopher; and, to obviate the danger of a similar disaster to that which had overtaken Descartes, the guide recommended a friendly demon who undertook to occupy his body during his soul's absence. Thereupon Father Daniel sets out on his journey. The great vortices are passed through and described, and after various delays, due to the obstruction and obstinacy of some Peripatetic and other anti-Cartesian philosophers who intercept and seek to deter him and to discredit his master, he at last finds Descartes in the extension beyond the vortices where as yet there is no world because the extension has not been disturbed by movement. Here are all the conditions for the great experiment, and Descartes is easily persuaded to demonstrate his principles and make good his claim that given extension and movement he would create a world. He begins by measuring out geometrically a foursquare portion of extension, and then proceeds to impart movement to it. Everything succeeds admirably and the creation goes forward according to plan.

The movement fractures the extension along the lines of the packed cubes; then, as it continues, the cubes are seen to lose their angles by abrasion and finally the three kinds of matter are formed. The demonstration is apparently complete, but the visitor is still curious and unsatisfied. He wants to see the subtle matter generate *bêtes machines* and fit these machines to receive the soul. He finds to his disappointment that this is not so simple as he had hoped and that it is going to take a much longer time than he dare spare. Beneath the satirical device the author takes occasion to criticise the whole system. His criticism has no longer for us any special importance. What is of interest, however, and what he brings out with surprising force is the contrast between the simplicity of the principles in operation and the complexity of the living world to be produced, and the impossibility of passing from one to the other.

Would Father Daniel have fared better had his journey been in Newton's world instead of in Descartes'? The modern physical theory has this in common with Descartes', that it presents the limits of physical reality as existent in the form of extremely simple units with extremely simple external relations; unit electric charges; negatively charged electrons in fixed orbits controlled by positively charged nuclei; atomic systems of electric forces in more or less stable equilibrium and more or less independent; molecules in which the atoms arrange themselves in more or less complex positions, all situated in the absolute space-time framework conceived by Newton. Let us imagine a journey to this world with a modern physicist for our guide. Should we be able to witness the work of creation? We need not adopt Father Daniel's device of leaving our body behind, for the journey is not

through space to the external limits of the stellar systems; we have only to imagine ourselves shrinking in dimension (or conversely to imagine the objects of perception growing in dimensions) until ordinary sense objects disappear and give place to their ultimate material constituents. Let us suppose that by some such device we have been able to enter the world of the physicist's atomic systems. We find ourselves in a world of extreme simplicity, extraordinarily easy to understand. Our guide will indicate the nature of the unit electric charge, the elementary condition behind which there is nothing at all. He will demonstrate the forces binding the units into atomic systems. We shall see the electrons revolving in their orbits round the positive nuclei. We shall see the disturbances of the orbits and the oscillations which cause the radiation of light. We shall see the building up of the various systems corresponding to the ninety-two elements. There is no reason why everything should not proceed exactly as physics teaches, for in physics there is no guile and in the physicist no legerdemain. Yet if we expect to see the work of creation we shall be, like Father Daniel, unsatisfied and very curious. We shall also be puzzled. We have supposed no breach of continuity in our journey from the world of sense experience to the world of its conditions, yet how are we to connect the world we have come to with the world we have left? Doubtless the objects of our new world will reveal themselves by sense qualities, as the objects of our living world do, and no doubt also the electrons will present infinite individual differences to our observation; but whatever the nature of the new sense qualities they will not account for, or be identical with, or be continuous with, the old. For example will anything our guide can point out to us show us

the chemical qualities of the elements being generated out of the quantitative building up of the atomic systems? Will he be able to show us in the behaviour of a unit atomic system, or of a unit electric charge, anything which indicates the way or interprets the mode in which in ordinary life these atoms are overruled or subordinated to special purposes by macroscopic dispositions? Will our guide be able to tell us as we journey through his world that now we are in a mammalian blood stream, now in a neuron in the brain of a poet? Can the physicist give us the slightest hint of the way in which unit electric charges become a world of objects with sense qualities? Can he even explain the relation of the quantitative differences of physics to the qualitative differences of chemistry?

Let us try to come to close quarters with this difficulty. It is very important to see that there is a real discontinuity between the world of experience and the physicists' world of constituent elements, and that it is not due to the fantastic fiction of a journey by which I have chosen to present it. We have imagined ourselves journeying in Newtonian space, not through the stellar universe, but from the world of our ordinary dimensions to the world of ultimate minimal dimensions, and there has been no point in our journey at which its continuity could be broken. At what point, then, did we lose touch with our sense world, and why do we find it impossible to reverse our direction and see, as we journey back, the world of sense experience being created? There is something wrong. There is something in the modern atomic theory which does not work, and it is useless to put it forward as a representation of the objective world in its simple constitution. The modern theory suffers from a funda-

mental defect just as the old Democritan theory did. Democritus conceived the atoms to be falling eternally through the infinite void and by their shock and aggregation to be forming worlds. Epicurus saw that, if the first part of the theory were true, there could be no shock and no agglomeration, for the atoms would pursue parallel paths for ever. In order to account for worlds he found it necessary, therefore, to endow the atoms with a *clinamen,* a kind of attraction towards one another, and further to fit them with curved tails or hooks by which they could become attached to one another. In precisely the same way, if we assume that the modern physical atomic systems are really existent, and suppose that, either by the reduction of our magnitude proportionately to their dimensions or by the aggrandisement of their dimensions proportionately to our sense apprehension, we should be able to perceive them at work, we find our assumption involves a clear breach of continuity. We are conceiving the constituents of a world in a way which makes the constitution of a world by these constituents impossible. No kind of *ad hoc* assumption will serve us. We are not only disguising our ignorance, but we are fooling ourselves when we assume that quantitative combinations acquire by mere complexity qualitative characters not possessed by the constituent units. If we are quite frank with our difficulty we must conclude that the physicist's reality does not exist in the meaning we ordinarily give to the term existence, the meaning, namely, that under specified conditions, atoms, electrons and unit charges would be sense qualified objects of perception. Electric unit charges have no sense qualities. They have no secondary qualities because they are conceived as the conditions in the objective world of the existence of colour, tone,

and other sense apprehended qualities in the subjective world; and they have no primary qualities because they are conceived as the dynamical conditions of the static shapes and material solidity which we apprehend by sense.

Are we, then, to reject the physicist's world as unreal and denounce it as pure fiction? To do so would be to misunderstand it completely. The physicist's reality is a schematism of abstract material agency. It has the same sort of reality as the object of a mathematical definition. We have in geometry the exact counterpart of the position in physics. No one supposes that by ruling ever thinner lines on a sheet of paper with an ever sharper pencil we should at last rule a real line conforming to the geometrical definition. No one denounces mathematics because the real world is not built up of points without magnitude, lines without breadth, surfaces without thickness. It seems, however, that it ought to be different in physics, because unlike mathematics, which is a science of the abstract, physics is a science of the concrete, and also physics is able to employ the experimental method. For these reasons we think the concepts of physics must be real, existent facts, not fiction, and this disguises their use as schematised working models.

The fact is that the invention of the spectroscope, and the extraordinary extension to the range of scientific analysis which it has given us, have raised the same kind of hope of insight into the absolute construction of the material universe as that which the invention of the microscope raised in an older generation. The microscope seemed to bring us perceptibly nearer to the limits of material divisibility, and though it might never be so perfected as to reach the actual constituent bricks of the building it seemed reasonable

to suppose that it would enable us to form a definite idea of their nature. The hope was not fulfilled and the revelation of the microscope was of a totally different kind. It revealed, as philosophers were not slow to interpret it, the relativity of magnitudes. It revealed worlds within worlds. It disclosed below the limit of normal discernibility forms of living experience, organised structures functioning within ranges of activity as boundless to them as ours to us. It led to curious speculations concerning the nature of germs and seeds, but it removed farther off than ever the absolute limits of the universe on its microscopic side. The spectroscope, on the other hand, seems to transport us in a leap to the limiting conditions of the physical universe. It does not indeed give us direct perception of atoms and electronic oscillations, but it gives us direct perception of their immediate effects. It enables us to analyse the phenomenon of light and its radiation in a way which invites and requires interpretation. The atomic systems are working models or schematic arrangements, diagrams of the modes of active processes, tested by their adequacy to interpret the phenomena. The triumphant success of the modern atomic theory need not deceive us as to the purely fictional nature of the construction. The concepts of physics bring us no finality. The moment we think of them as existent entities the assumed units become infinite manifolds. If it were possible to peep behind the spectroscope and perceive the real conditions which account for the spectroscopic phenomena, to view them as sensible objects, they would then themselves require us to conceive the real condition of their existence. We should be no nearer the limits of the world than we had ever been; we should be in a new world as boundless as that of our present activity.

The defect of Newton's assumption that there is an absolute space-time framework of the universe is that it promised us the satisfaction of reaching, at least theoretically, the limits of the universe on its inner microscopic side. It has disappointed us in fact. We have been imagining a journey in Newton's world to the ultimate physical units of matter, and like Father Daniel's journey in Descartes' world it has proved most bewildering. Were Father Daniel with us to-day, however, we may be sure it is in Einstein's world he would wish to journey. He would have surprising adventures and abundant scope for his witty satire, but possibly he would escape that breach of continuity, at once so evident and so inscrutable, in each of the other worlds. Let us try, then, to imagine a journey in the same spirit and for the same purpose, but in Einstein's world. We will take a relativist mathematician as our guide and set out on a voyage to the limits of the universe where worlds are being created. Our progress will be from one system of reference to another, and our guide will explain to us that our world is subject to a new principle, the principle of relativity, and according to this principle whatever system we enter we are at once *chez nous*. Our journey is not as the others were, through an absolute extension or an absolute space-time; it is from one space-time system to another space-time system, and yet space-time will not seem to us to alter, because the space-time of the new system of reference will be our own co-ordination of dimensions in that system and will, therefore, automatically adjust itself to our *chez nous* attitude. Our own system is always at rest relatively to moving systems. There is nothing really complicated in the principle of relativity, and it is abundantly illustrated in ordinary experience. Descartes was the

first to call special attention to the fact that the earth is at rest for everyone at home on it, just as, he said, "I am at rest in my cabin in the ship which is transporting me from Calais to Dover." When we are at home on a system of reference, attached to it, as we say, then we co-ordinate the whole universe from the standpoint of that system as our fixed point. We measure distances—lengths, breadths and thicknesses —and time-intervals, by unvarying measuring rods and clocks. Observers on other systems may see the movement of our system and the effect of it on our measurements; they will, as mathematicians say, compound the velocities of our movements within the system with the movements of the system, and therefore to them all our measurements will seem distorted. The principle of relativity is that, if we leave our system to enter another, then we automatically become attached to that new system, and it becomes the system at rest from which we co-ordinate the whole universe. Our journey, which we are supposing is, then, to the realm of the physicist's concepts, to the world in which atoms and electrons are not merely mathematical fictions, but sense apprehended reality. This new world is relatively to our own infinitesimal, its dimensions being in the range of thousands of trillions of degrees lower. Yet even an electron as we enter it and become attached to it, instead of revolving round its nucleus at thousands of times a second, becomes a system at rest, and from that standpoint we co-ordinate the universe. This means that our former terrestrial dimensions become automatically the new atomic dimensions, and the movements which appeared to be the movements of the electron become the movements of the terrestrial system. The mathematician can easily supply the formula. Journeying through the universe, then, con-

ceived as the principle of relativity requires us to conceive it, we never reach limits or constituent units of the absolute material type, for there are none. The universe consists of infinite systems of reference, each co-ordinated by the observer within it from the individual standpoint of taking it at rest. Like Gulliver we are traveling to lands of completely different dimensions to our own, but unlike Gulliver our own dimensions always and automatically correspond to the dimensions of the world we enter. The difference is real, and we can calculate it, but not by appealing to our sense apprehension.

It is a queer kind of progress, then, that we shall make in our journey through Einstein's world. We find in fact that, however far we go, we are always where we were. We may choose our system of reference, but in choosing it we make it the centre of the universe, and from that centre the universe extends outwards with its dimensions equal in all directions. It is, wherever we are, around us and above us and beneath us, an infinite vista. The systems we have left as we enter the new system take their places in a new perspective. In Einstein's world we cannot reach simpler conditions than our experience, that is, the conditions of our experience. We cannot leave behind the complexities of sense and understanding to become acquainted with the primordial constituents of the material world in their bare existence. Einstein's world is very different from that which science has hitherto accustomed us to regard as real, and yet when we reflect upon it, the new conception he has given us of the nature of reality is much more in accord with our experience than was the old. It calls indeed for an intellectual effort to comprehend it, just as the conception of the antipodes called for an intellectual effort

from the generation which received the Copernican discovery. The diurnal revolution of the earth involved the notion of a continuous change of direction in our bodily position in the material universe. Gradually, moment by moment throughout every day, up-and-down, above-and-beneath, are changing meaning absolutely so far as their reference is to the external world, yet up-and-down, above-and-beneath keep a constant meaning in our experience. The solution is identically the principle of relativity. It is that the system to which we are attached is always a system at rest, a system for which up-and-down, above-and-beneath are determined. We move through an infinite series of systems in the course of twenty-four hours, and each as we enter it becomes to us a system at rest. It is a condition of living activity that we occupy the centre of the universe and co-ordinate it from an individual standpoint.

In modern science the relativity of knowledge has a significance it never had before. It has hitherto been taken to mean that knowledge is relative to the activity of the mind in knowing. It is now, in the light of evolution, seen to mean that knowledge is relative to life and to be interpreted in terms of living activity. The old doctrines of philosophical idealism—the identity of *esse* and *percipi,* the denial of material substance, the affirmation of the agency of thought or consciousness—with their implication of subjective illusion as to the reality of the object of knowledge, have always been resisted and resented by science as fatal to progress. The relativity of knowledge, however, has acquired, in science to-day a purely objective meaning. This is due to the discovery that any and every purely objective statement of fact, be it so simple as a measurement of the distance between two points

or the interval between two events, is relative to a space-time system and can only be determined when that system is given. It is not enough to say "here" and "now," for there is no absolute space and no absolute time, we must always designate whose space-time we refer to before we can define the most simple objective relations of any fact or event. The old notion that knowledge is the subjective act of a mind directed on an independent object revealed to it, the old distinction of philosophical realism between act of perceiving and object perceived, in the light of modern scientific theory is completely discredited. Relativity in becoming a principle of science has acquired a new meaning and a distinctively objective reference.

In the early part of the nineteenth century the idea of the positivity of knowledge was made the basis of a philosophy of science. Positivity did not mean that science was concerned with noumenal reality, that it was, in Kant's meaning, knowledge of things-in-themselves. Positivism did not question the phenomenological character of knowledge, on the contrary it affirmed that this phenomenological character was matter of fact and not subversive of scientific certainty, and did not require supplementing by metaphysical constructions. Physical science has throughout its modern development kept faithful to this ideal. Science is impatient of dialectical subtlety; it relies on the pure experimental method and it is hostile to all metaphysical systems. In accepting, then, the principle of relativity from the mathematicians and the principle of the relativity of knowledge to life from the biologists, is science abandoning the ideal of positivity? The answer is that, so far from undermining the positivity of science, the new principle places it for the first time on a sure and secure basis. It has seemed

hitherto that positivity implied the recognition of the independent existence of a pure abstract objectivity. This has been interpreted as meaning that the object of knowledge is absolute, having its definite prescribed position in an absolute space-time order, indifferent to any kind of activity which it may be needful for a mind to exercise in knowing it. It is this interpretation of the implication of positivity which has failed.

It is instructive to study the last great effort of science to provide for itself a basis of pure objectivity. Physical science had to face a dilemma. In the first place it had to recognise that the immediate data of consciousness are subjective affections. All our knowledge in its first form is ideal; it consists of sensations and perceptions, or, to employ the terms of Hume, of impressions and ideas. These affections of the mind are invariably interpreted as a reference to reality, yet there is in fact no passage from the idea to the reality. This was one horn of the dilemma, and the other is that science in affirming itself posits "Nature closed to mind." Science in its first intention is discernment, discrimination, discovery. Faced with this dilemma, not merely in psychology, but in physics and throughout the whole domain of natural science, philosophers devised a scheme of psycho-physical parallelism. It was a policy of despair. Many who embraced it hoped no doubt that its purpose as a provisional *ad hoc* hypothesis would be served, and that it would disappear when the real basis of the unity of knowledge and reality stood revealed. Its actual effect, however, was to give substance to a complete misconception of the nature of knowledge and its relation to life. It blocked the only fruitful line of research, that is, the study of knowledge as an essential form of living activity. The hypothesis was that there are two inde-

pendent series of conditioned events, one a succession of ideas in the mind connected by laws of association, the other a succession of physical events related by mechanical actions and reactions into a series of causes and effects connected by laws of nature. These two series do not interact, but there exists between them a certain point-to-point correspondence which enables an inference to be drawn from the one series to the other. The hypothesis bristled with difficulties. In the first place such correspondence as there might be was purely one-sided, for all real agency was attributed to the physical series, and the inevitable, and not wholly unwelcome, consequence was to deprive ideas of all but a shadowy existence. In the second place the directing and ruling force of ideas became more mysterious than ever. The real difficulty, however, was dismissed almost scornfully, for no one imagined that the ideal representation of reality could be germane to the question of essential absoluteness in physical reality itself. The human mind appeared indeed to be handicapped in a thousand ways in its search for truth, but with all its marvellous activity it could be no more than a passive recipient of revelation so far as the reality of nature is concerned.

What was lost sight of in all this determined effort to establish science on an absolute basis of independent objective reality is the essential relation of knowledge to life, the dependence of the form of objectivity on the nature and range of living activity. This could only appear in the light of the evolution theory. The evolution theory has completely changed the whole picture of nature. To represent the evolution theory as concerned only with the science of biology, to suppose that it leaves all the physical sciences standing where they were and that it is simply a hypothesis to

account for the origin of certain complex material organic structures, is not to misrepresent the theory, it is to fail completely to see its significance. Wherever we look throughout the whole living world we see individualised products of evolution in the form of specific adaptations to a prescribed range of activity. We may choose any one of these forms and study it from the evolution standpoint. To us its restricted range of activity is presented as an object, taking the character of our own objective outlook on our own universe, with its place as part of the plan of that universe. From its own standpoint, however, and from our standpoint when we adopt the evolution theory, it is a form of activity developed *pari passu* with our own, acting and reacting to its own environment from its own self-centred individual standpoint. It possesses conscious awareness commensurate with the range of its free activity. It is not a structure *with* a function, it is not a body *with* a mind, it is not a subject *with* more or less adequate representations of objects. It is in its undivided and indivisible activity a specific product of evolution. Man is one of these individualised products of evolution. If we could view him in the same perspective as that in which we view the other forms, if we could see man as perhaps the angels see him, he would appear with a prescribed range of activity, and with a conscious awareness commensurate with his freedom within that range. To suppose, as the early evolutionists did, that man's structural organism alone is the outcome of evolution, that his knowledge is adventitious and absolute, however limited in extent and degree, is to destroy the whole value of the theory as well as to miss its significance. It could only mean that man, though in every other respect analogous to the other products, had the

extraordinary and special privilege that his knowledge, however restricted, was absolute, while that of every other species of living creature was relative and distorted. If evolution is true, we can be confident man has no privilege. Man's world is a human world, man's knowledge is human knowledge. No knowledge is absolute, or, what is the same thing, human knowledge is only absolute for man in the same sense in which canine knowledge is absolute for dog, ant knowledge or bee knowledge for ant or bee.

It is easy to illustrate, for wherever we look illustrations abound. Consider the life of the minnow in a brook. As an object in our world we can study it in the whole range of its activity, from its emergence out of the egg to its disappearance in the maw of a trout. We perceive its limitations in the objective imagery of our own sense experience—the brook, the water of the brook, the bubbles of air in the water, the descent of the stream, the current and the pools—to us a very circumscribed world. None of these things exists for the minnow; there is nothing in its experience identical in any sense whatever with these objects in our experience. The difference between minnow experience and human experience is not a difference of knowledge but of reality Its world has no point correspondence with ours. Yet by every analogy the minnow universe is as limitless and as absolute to the minnow as the human universe to man.

When the full significance of the doctrine of evolution is realised, it is seen to affect our conception of reality to its full extent. The universe studied from the evolution standpoint breaks up along division lines quite different from those with which physical science has familiarised us. Physical science directs its analysis exclusively on the object of knowledge, in complete

abstraction from the activity of knowing; it emphasises the materiality of the world and seeks to lay bare the ground of all existence in the discovery of the absolutely inert. Evolution emphasises the monadic character of the real. Life is pure activity, yet this activity never assumes an abstract form; we meet it only in the form of concrete individuality. It is not in the abstract concept of activity, but in the living actuality of individual experience that we touch the absolute. Evolution shows the dependence of theory of knowledge on theory of life. The sciences are not imposed on us by the brute force of indifferent fact; they arise out of the practical necessity of action. They are schematizations of our activity. To the extent to which we are able to comprehend the human mode of activity, or indeed any of the innumerable modes of activity which we see actualised in the world as the outcome of evolution, to that extent can we say in advance what form the external world will assume to the individual and along what lines its science will be schematised.

This new view of life and knowledge is no longer a metaphysical speculation; it does not hang in air; it has solid foundation in the confirmation ever growing stronger of the sciences themselves. In the pre-evolutionary period the existence of a world common to all modes of conscious activity, to which all modes of consciousness had reference, seemed an obvious and immediate inference from the fact of knowledge itself. This world was imagined in its most general form to exist ultimately as purely inert matter, and this matter to be determined absolutely in its form by its spatio-temporal relations. The typical expression of this view in its simplest philosophical form occurs at the

beginning of the modern scientific period, in Francis Bacon's method of scientific induction. For Bacon there existed, on the one hand, the world of pure objective fact, on the other, the disinterested observation of facts, and the ideal of scientific method was the observation of facts in their plain actuality. There was nothing in facts themselves, he thought, to prevent the observation of them, but as the observers of facts are human beings swayed by passions and emotions they tend to contract habits and become encrusted in dispositions which obscured the direct and immediate nature of the objects contemplated. The first and most difficult task of the scientific inquirer, therefore, is a work of self-discipline. He must be able to detect and rise superior to the *Idola,* false notions of things, or erroneous ways of looking at nature. The *Idola,* he said, are of four kinds: *Idola Tribûs,* fallacies incident to humanity by reason of human nature itself; *Idola Specûs,* idols of the cave, errors due to the peculiar mental or bodily constitution of the individual; *Idola Fori,* idols of the market-place, errors arising from the influence of words; *Idola Theatri,* idols of the theatre, fallacious systems of philosophy and erroneous methods of science. In a fragment published after his death, the *New Atlantis,* Bacon has portrayed an ideal race of men freed from the prejudices of the *Idola,* engaged in collective, co-ordinated observations, and producing a body of pure science rich in practical applications.

The history of modern philosophy shows the difficulties which this conception raised in theory of knowledge. The development of science following on philosophical criticism has led to its abandonment even as an assumption or working hypothesis. The formula-

tion of the principle of relativity is proof that physical science is not necessarily based on the intuition of an absolute space, time and matter, and shows, moreover, that the assumption of such an absolute is useless. If we accept the theory of evolution in the full significance we have claimed for it, then we can go even further and say it is impossible that there can exist a common world in the Baconian meaning. There is a common world of discourse, but it is a conceptual, not an intuitional, world, and it depends entirely on the human mode of conscious activity. There is no world with absolute predicates, existent in its own right, and if we choose to believe that somehow such a world may exist, we know that at least it is not the world to which any two intercommunicating beings refer. What we must have in order to hold intercourse is a common system of reference, but this each of us frames out of his own experience. A system of reference is purely relative, and in making it our system we make it absolute as a particular standpoint of observation. This absolute is the absolute of experience, that is, it is experience in its immediacy, not a condition of experience nor the cause of our having experience. The universe, if we accept evolution, is not a space-time continuity, but a continuity of space-times.

"Le véritable Amphitryon est l'Amphitryon où l'on dîne," declares the valet Sosie in Molière's witty play. So we may say the real world is the world of experience. There are as many worlds as there are subjects of experience, and there are no other worlds, or rather, there is no one world which is no one's world and everyone's world. We have sought the unity of existence in the abstract object of knowledge severed from

the living experience of individuality and hypostasised. That path has failed us; evolution points another way. The unity of existence we now find is in the individual experience itself, inasmuch as evolution shows us the individual as the actualisation of an activity which is universal—life.

CHAPTER VIII

THE IDEAL OF DISINTERESTED KNOWLEDGE

Montaigne, in the most philosophical of his delightful essays, the *Apologie de Raymond Sebond,* says (I quote Florio's translation):

> Whosoever seeks for anything, cometh at last to this conclusion and saith, that either he hath found it, or that it cannot be found, or that he is still in pursuit after it. All Philosophy is divided into these three kinds. Her purpose is to seek out the truth, the knowledge and the certainty. The Peripatetics, the Epicureans, the Stoics and others have thought they had found it. These have established the Sciences that we have, and as certain knowledge have treated of them; Clitomachus, Carneades and the Academics, have despaired the finding of it, and judged that truth could not be conceived by our means. The end of these is weakness and ignorance. The former had more followers, and the worthiest Sectaries. Pyrrho and other Sceptics, whose doctrine or manner of teaching, many ancient learned men have thought to have been drawn, from Homer, from the seven wise men, from Archilochus and Euripides, to whom they join Zeno, Democritus and Xenophanes, say, that they are still seeking after truth. These judge that those are infinitely deceived, who imagine they have found it, and

> that the second degree is over boldly vain in affirming that man's power is altogether unable to attain unto it. For to establish the measure of our strength, to know and distinguish of the difficulty of things is a great, a notable and extreme science, which they doubt whether man be capable thereof or no. That ignorance, which knoweth judgeth and condemneth itself, is not an absolute ignorance: For, to be so, it must altogether be ignorant of itself. So that the profession of the Pyrrhonian is ever to waver, to doubt and to enquire; never to be assured of anything, nor to take any warrant of himself.

It would not be difficult to arrange modern philosophies under this tripartite division. There are naturalists and positivists among us who base themselves on the sure and secure knowledge which they claim to have established in the physical sciences. There are the idealists who continually draw attention to the nature of the mind and conclude that it is impossible to establish science on a detached basis of pure objectivity and refer to it as absolute. And lastly, there are those whom it is difficult to name, but whom perhaps we may call the pragmatists, if we may use that term not in its narrow meaning, but in the wide meaning, which would include all who hold that the human intellect, human reason, human culture are modes of an activity manifesting itself in continual creation and novelty. These are the true philosophical sceptics. For them truth is not something found, nor something hidden behind a veil which a natural disability prevents us from penetrating, but something which is ever being sought for and ever, in the searching, found.

The conspicuous success of the physical sciences in the modern period has had a kind of hypnotic effect on the human mind. We have gained so close and intimate an acquaintance with the structure and constitution of the material universe, and also with the direction of the movements of its vast conglomerate masses, that human nature itself seems insignificant in comparison with it; and it seems, therefore, as though this very human nature can only be explicable in terms of physical reality. It has become in consequence increasingly difficult to appreciate the actual nature of science and its entire dependence on human nature, so much so that when the principle of relativity is seen to involve the rejection of a purely objective system of reference, such as physics has hitherto relied on, when this absolute system is rejected as not only unnecessary in theory but as non-existent in fact, it appears to many like laying sacrilegious hands on the ark of the covenant.

The philosophical advance in our time is in great measure due to the direction which scientific inquiry has taken in the criticism of scientific postulates. We owe to the leaders of research in mathematics and physics the clear enunciation of the philosophical position (1) that knowledge is relative, (2) that science is schematic, and (3) that the various schemes of the natural sciences do not themselves form a unitary scheme of nature. For the unity of nature we have to evoke a principle outside and independent of the principles which are regulative of each science within its own domain. All this would have been denounced as rank heresy by the great scientific leaders of the nineteenth century. Let us examine these three new positions in order. Together they have effected a revolution in our concept of the nature of the physical universe.

I. The Relativity of Knowledge.

The theory of evolution has given new meaning to the relativity of knowledge. It has forced upon our attention the significance of the fact that, wherever and in whatever form we meet with evidence of knowledge in the living world, it is purposive. Knowledge is not the final end or goal to which evolution is directed. Knowledge is always subservient to the particular form of activity which the evolution of life is actualising. In the first place we observe that in every species of living creature into whose activity conscious awareness appears to enter as a factor, its knowledge is a product of sense apprehension, and the peculiar form which its knowledge assumes must clearly be determined by the predominance or subservience in its conscious experience of the various special senses. Take first our own case, the human mode of apprehending external reality. The form in which the objective world presents itself to man is dominated by vision. Man is predominantly a visualiser. In his objectification of external reality, touch, hearing, taste and smell group themselves round an object which is ultimately visual. Objects which in their nature or definition are non-visual present themselves to our minds as what they would look like if we could see them. This is borne out by the study of the comparative anatomy of the human brain. In man the fibres of the optic nerve of the two eyes intercross, and the visual area of the brain is extensive and highly developed, and, more important still, the evolution of the neo-pallium seems to have had as its directing motive the overgrowth and supersession of the olfactory and other special sense areas by the visual. We do indeed ordinarily rank touch above sight as guaranteeing the reality of external objects, but even the tangible qualities of

objects are present to the mind in visualised form. In cases of blindness, congenital or accidental, in which the subject of knowledge has no visual experience, he is still by his human nature a visualiser, for were he not able to substitute some scheme of visualisation for the natural endowment in which he is defective, he could not take part in human discourse. If we are to judge, however, by comparison of the structure of the brain and of the disposition of the sense organs in other species below the human, we must conclude that there are completely different presentations of objective reality, that the external world for them in fact divides itself objectively along quite other division lines, and that the general form of objectivity is mainly determined by the predominance of other sense organs than ours. Can we really doubt when we take the standpoint of evolution that the form in which the objective world presents itself to consciousness is due to a functional mind-integration of sense apprehension, analogous and strictly correspondent to the structural brain-integration of the various special organs and parts of the body? If, indeed, we infer from our sense experience that there is an independent external reality, the useful part this inference plays in our economy suggests that it is itself a contrivance of evolution, but the assumption of absoluteness in the object of knowledge is as fatuous in physical science as it is untenable in philosophy. The integrative function of the mind of a knowing subject is in fact as pronounced as the integrative function of the brain of a living organism. Everyone is familiar with the fact that when a worm is decapitated, accidentally or intentionally, the tail squirms. There is a simple interpretation. It is that the integrating function of the supra-oesophageal ganglion being no longer effective and consequently the

power of inhibition being destroyed, the various lower nerve centers are uncontrolled. A precisely similar function is performed by the mind in the integration of sense experience. In the very nature of the case, such integration can be effected only from within and not from without.

Let us now consider another fact equally significant. Every knowing subject is self-centred in regard to all his objective knowledge of the universe. That is to say, for each of us, considered as an individual conscious of an environment, the universe extends from the actual here-now, the actual point-instant of the individual experience indefinitely and equally or equivalently in every direction. If we try to co-ordinate the universe, that is, to measure its spatio-temporal dimensions from any arbitrary detached standpoint (and we are always under the illusion that we can choose any point-instant in the external space-time continuum), we fall into contradiction and absurdity. Let me illustrate my meaning. The external universe extends for me indefinitely in every direction from my actual here-now. When I think of its space I think of an extension to the west as being absolutely equivalent to an extension to the east, and it would seem absurd to suppose that the universe might extend further to the east than it does to the west. When I think of its time the past stretches behind me, the future before me, and it would seem equally absurd to suppose that the future is shorter or longer than the past. Yet at the same time I imagine that during my finite existence real time is elapsing and real space is being traversed. If this real time and real space are absolute and independent of me, I am confronted with a curious and obstinate self-contradiction. A year ago the here-now of my past existence was precisely identical with the here-now of

my present existence, but how stands it with the year which divides the two point-instants? Is the future one year shorter, the past one year longer, now than it was then? The contradiction is obvious and needs no comment, but how am I to get rid of it? This is not the antinomy of space and time familiar to us in Kant's dialectic of the pure reason, an antinomy arising out of the concept of infinity; it is a contradiction which arises whenever we represent space-time as independent of our co-ordination of the universe. There is one way, one only, of reconciling the contradiction, viz., the principle of relativity. The subject in the knowing relation is active, the centre from which his activity is directed is constant, however to himself or to onlookers it may vary.

From the scientific standpoint, however, the relativity of knowledge is a direct implication of organic evolution. Stated simply, it is that the biological principle admits no exception. If the human species is an outcome of evolution, then our complete human nature, our nature in every aspect of it, must have been moulded by the forces, whatever they are, of the vital activity finding expression in the human form. It is inconceivable that man's specific actions should have evolved independently of and indifferent to his way of thinking, that his behaviour in the world should have no relation to the nature of his ideas. The relativity of knowledge acquires a meaning in the light of evolution which could not, in the nature of the case, have found expression until that concept had become an interpretative principle. To appreciate this meaning we have only to consider the view of the intellect and of knowledge which was practically unchallenged in the pre-evolution period. On its passive side intellect was illumination, on its active side, reason. There was

wide difference of opinion as to its origin. Theologians considered intellect to be possessed by God in an eminent degree and pointed to its presence in man as evidence of his participation in the divine nature. The scriptural myth of man's creation in God's image was spiritualised or allegorised as indicating man's rational nature. Materialists and sceptics who rejected revelation and recognised no authority but reason held that this reason had somehow emerged out of the activity of matter, and saw no incongruity in supposing that highly organised matter should produce rational thought, at least analogously to the way in which glands produce their specific secretions. Philosophers had the most various and antithetical theories. Descartes, for example, held that thought was an immaterial substance distinct from and the opposite of material substance. Locke, on the other hand, held that there was nothing contradictory in the idea that the brain, a material organism, thinks. But, whatever might be the special theory of the origin of man's intellect, there was no disagreement as to the essential nature of that faculty. The intellect meant that man had a power of discernment enabling him to be aware of his environment and to utilise his knowledge of reality. Ignorance, error, illusion, with their concomitant vices in action, were not considered as detracting in any way from pure intellect or sullying its pristine clearness, they were due to an obscuring and confusing of its illuminating power by man's sensuous and emotional and passionate nature. Knowledge in the perfection of its possession by God was an ideal to which human knowledge could only approximate in a very inferior degree, but knowledge itself was absolute. Man sees in a glass darkly. Theologians explained the obscurity and confusion of man's ideas by a theory of

a fall or descent; materialists, on the other hand, conceived understanding and reason as a perfection of material organisation, but both alike conceived knowledge as beyond dispute the apprehension of reality. Moreover the intellectual nature which is distinctive of man was not conceived by either as a special mode of apprehending reality, but as a higher degree of the power to profit by the light of reason.

Evolution in providing us with an interpretative principle has opened a new chapter in the long controversy surrounding theory of knowledge. The evolution theory enables us for the first time in the history of philosophy to go behind the intellect, to apprehend the more fundamental, more general and universal form of the activity of which the intellect is a specific mode, and so to deduce its nature from its origin. From the evolution standpoint we can study our intellect just as we study any other phenomenon, isolating it by observing the form it assumes, the purpose it serves, and the mode in which it operates. It is perfectly true that it is only by using the intellect that we can study the intellect, and yet we are not on that account involved in a circle, nor confronted with antinomies such as Kant had to meet when he proposed to study the *a priori* conditions of the possibility of experience.

Human intelligence is a phenomenon of living process. It is not substantive, but dynamic. It is a specific mode of knowing and acting. It is not a product of neural organic structures, fixed in quantity, measurable in output and discoverable by mechanical intelligence tests. Intelligence tests, if contrived to discover whether an individual possesses more or less of something we suppose his brain to produce and his organism to contain, are just as absurd in the conception of them

as would be, say, instinct tests. Imagine a scientific researcher proposing to test the amount of instinct which different individual sparrows possess, by devising schemes of interference with their mating and nest-building activities! It is evident at once that, whatever interesting results might be obtained by tabulations and correlations, it would certainly not be instinct which was being determined in amount. Precisely the same is the case with intelligence. Whatever useful purpose may be served by so-called intelligence tests, it is quite certain that in carrying them out we are not measuring some stuff or product fixed in its quantity or even in its degree.

Life as we view it from our modern standpoint of evolution is the manifestation, in innumerable forms of individual activity, of a single principle, one in origin, continuous in process, inter-related in all its ramifications. From this standpoint life is a power of creation. Creation does not mean that life moulds inert matter into automatic self-repeating machines, or that it creates individuals in order to endow them with sundry enjoyments. Creation means that life evolves, in the development of its own activity, the modes which realise its activity, and fixes these modes in specific forms. Individuals—finite, temporary existences endowed with the power of reproduction, and thereby with the power of repeating a range of activities—are the means, not the end, of this creative evolution. This is the modern concept of evolution and it has changed the world-problem. To see the profundity of this change we have only to compare the modern problem of instinct and intelligence with the form it assumed in pre-evolution philosophy.

The problem of instinct entered very deeply into the

philosophical controversies of the seventeenth century. Students of Leibniz are familiar with the name of Rorarius. It was the title of an article in Bayle's *Dictionary* which served in its lengthy annotations as the medium of a criticism of Leibniz's important theories concerning the nature of the animal soul. The article itself is simple enough. It tells us that Rorarius, Clement VII's Nuntio at the Hungarian court, was the author of a book printed in the Grisons in 1548, which undertook to prove not only that the brutes are rational animals, but also that they make a better use of reason than man himself. The book, the article went on to say, contains a quantity of singular facts on the industry of brutes and the malice of man. What gave interest to the article and furnished the matter of the annotations was that those facts which concern the cleverness of animals are embarrassing alike to the followers of Descartes, who deny that the brutes have a soul, and to the followers of Aristotle, who hold that they are endowed with feeling, memory and passions, but not with reason. In fact in the seventeenth century the problem of the nature of the animal mind occupied a foremost place in philosophical discussions. On the one hand there was the theory of Descartes that brutes are pure machines, devoid not only of intelligence and reasoning power, but of sentient experience in any form. The theory was supported by cogent logical arguments which indeed have not even to-day lost their force, yet it ran contrary to the natural inferences we draw from our observation of animal behaviour. The general opinion which was held then, like that which is widely held to-day, was that animals are influenced by pleasure-pain and have a sentient expe-

rience in all respects identical with our own, but are limited in their power of discursive reason. The only difficulty in such a view is that if we regard the notable instincts of animals, such as the nest-building instincts of birds, the hive instincts of the honey bees, as intelligence, they are intelligence of a higher order and certainly not lower in degree than the intelligence of man. Rationalists who eschewed the popular invocation of providence to account for instincts were in a curious dilemma; either reason is more powerful in the brute than in man, or else reason is absent from the brute creation altogether and the reasoning power of animals is a mechanistic illusion.

It is curious as well as instructive to go back a century earlier still, to the sixteenth century, to the renascence period before Descartes, and see the kind of notions which were prevalent in the intellectual world before Descartes formulated his new theory. "When I am playing with my cat," said Montaigne, to quote once more that prince of philosophical sceptics, "who knows whether she have more sport in dallying with me, than I have in gaming with her? We entertain one another with mutual apish tricks. If I have my hour to begin or to refuse, so hath she hers." And again:

> The swallows which at the approach of springtime we see to pry, to search, and ferret all the corners of our houses; is it without judgment they seek, or without discretion they choose from out a thousand places, that which is fittest for them, to build their nests and lodging? And in that pretty cunning contexture, and admirable framing

of their houses, would birds rather fit themselves with a round, than a square figure, with an obtuse than a right angle, except they knew both the commodities and effects of them? Would they (suppose you) first take water and then clay, unless they guessed that the hardness of the one is softened by the moistness of the other? Would they floor their palace with moss or down, except they foresaw that the tender parts of their young ones shall thereby lie more soft and easy? . . . We perceive by the greater part of their works what excellency beasts have over us, and how weak our art and short our cunning is, if we go about to imitate them. We see notwithstanding, even in our grossest works, what faculties we employ in them, and how our mind employeth the uttermost of her skill and forces in them: why should we not think as much of them? Wherefore do we attribute the works, which excell whatever we can perform, either by nature or by art, into a kind of unknown, natural, and servile inclination? Wherein unawares we give them a great advantage over us, to infer that nature, led by a certain loving kindness, leadeth and accompanieth them (as it were by the hand) unto all the actions and commodities of their life; and that she forsaketh and leaveth us to the hazard of fortune; and by art to quest and find out those things that are behoveful and necessary for our preservation: and therewithal denieth us the means to attain by any institution and contention of spirit to the natural sufficiency of brute beasts: so that their brutish stupidity doth in all commodities exceed, whatsoever our divine intelligence can effect. Verily by this account we might have just cause and great

> reason to term her a most stupid and partial stepdame. But there is no such thing, our policy is not so deformed and disordered. *Nature hath generally embraced all her* creatures; and there is not any, but she hath amply stored with all necessary means for the preservation of their being.

The first clear distinction between what we to-day call instinct and intelligence enters into philosophy in Descartes' doctrine. What we call instinct—the whole of animal purposive actions, including a large part of human actions, practically all those which we class as vital—is, according to Descartes, mechanistic, ultimately explicable as the effect of mechanical movements. What we call intelligence, including all forms of sentient experience, is in his view substantially independent of the body and the movements which have resulted in its organisation. Intelligence is the attribute of the soul and the soul is an unextended substance. It is curious to find that in the physiological psychology of the nineteenth century, the mechanistic interpretation of vital and instinctive actions reappears in practically the identical terms in which Descartes stated it. Modern science has indeed shown itself impatient of the Cartesian distinction between thought and extension, but only because the complete success of science has seemed to depend on the reduction of thought and reasoning themselves to mechanism.

The modern problem of instinct and intelligence arises out of the conception of evolution, for evolution fixes our attention on an activity of a quasi-spiritual kind. We may indeed conceive life as an animating principle accompanying the phenomenon of material organisation, and we may conceive the world as the stage on which diverse and infinitely varied forms of

organisation are displayed, but the moment we conceive life as a real evolution we are necessarily conceiving a spiritual, immaterial reality, the reality not of a structure, but of a process. The difference between a material evolution and an ideal or spiritual evolution is evident at once if we compare our conception of the evolution of a heavy atom with that of a higher animal. In the atom the growing complexity of structure is due to the addition of purely geometrical orbits, and the composition of forces is external and mechanical; in the higher animal we trace the growing efficiency of an integrative control of an external situation from a centre of internal consciousness. The evolution of species is the evolution of specific modes of apprehension and specific modes of responsive action, with specific structural adaptations to the external conditions of the environment.

It is true that in the early days of the evolution theory the whole bearing of the new hypothesis was towards mechanistic interpretation. Discussion centred round the origin of structural alterations. Consciousness was a problem, not on account of its nature, but in the mystery of its origin. Yet even the problem of its origin was not considered in any special way relevant to the evolution theory. The origin of consciousness, like the origin of life, was placed by Darwin outside the reference, and generally life and consciousness were regarded as being each, in its ultimate nature, simple and undifferentiated. Once secure of a foothold they underwent development, or rather they determined and controlled a continuous evolution of material organisation, of which the records were to be recovered in geological strata and of which the history seemed in a manner to be recapitulated in the individual's foetal development. In its simplest manifestation

life was a principle of perpetuating a functional activity by the self-maintenance and reproduction of material organic structures. Consciousness in its first intention was illumination, and it apparently existed in the living world in varying degrees and contributed in specific ways to efficiency.

Let us now turn from the historical to the actual position of the problem. When we survey the whole field of living activity we observe the widest differences in the part which consciousness plays and in the mode in which it intervenes. In the vegetable world consciousness seems to play no part at all, apparently not because it is absent, but because it is completely inhibited. A study of the activity of the growing plant reveals purposive actions at every stage, and purposiveness can be expressed only in terms of potential consciousness, yet rarely or never do we find ground to suspect the presence of sentient awareness in any form. In the free-moving animals, on the other hand, awareness of the environment is a necessary factor of their activity. An animal's life depends on discernment, discrimination, alertness, cunning. In the higher animals, while all the internal, vitally necessary functional actions are automatic and unconscious, all the actions which concern the behaviour of the organism as a whole, and determine its response to the environment, involve consciousness. In the outward behaviour of animals in which consciousness intervenes as a factor there are distinguishable two marked modes of response, instinct and intelligence. Instinct is a response to external stimulation which is immediate and unreflected, perfect and invariable, automatic and predictable. Intelligence is a response which is hesitant and deliberate, tentative and improvable, contingent and unforeseeable. So far as the individual

is concerned, instinct is innate and independent of experience; intelligence is the ability to profit by experience. Intelligent action takes the form of trial and error, and a fully intelligent animal is one which apprehends by sense perception, retains its experience ideally by memory, reflects on its consciousness, attends voluntarily to its actions and improves by practice.

If, then, we consider our own active life we see that we ourselves are individuals of a species of living animal in which each of three modes of responding—the vegetative, the instinctive and the intelligent is continually present. Our heart is beating, our blood is circulating, various processes of metabolism, oxidisation, ionisation are going on, conditioning our conscious life without normally evoking actual consciousness itself as a factor. All these vital functions are unconscious, like the vegetative activities of plants. Also we respond instinctively to external situations, and these responses involve consciousness, yet the resulting actions are generic and specific, particularly in our filial, connubial and parental relations and in our social relations generally. Then again we act intelligently in all situations which require consciousness to be focused in attention, in which purpose calls for deliberation and action is under voluntary muscular control. With regard to the specific modes of our vegetative and instinctive activities we have no hesitation in attributing these to evolution, and also in regard to intelligence we attribute to evolution the disposition of our organs and natural control of the voluntary muscles which makes the exercise of intelligence possible, but we do not usually regard intelligence itself as a product of evolution. This is because we regard intelligence as absolute in its nature, as illumina-

tion and revelation, as consciousness freed from all modality.

The relativity of knowledge, therefore, has come with the evolution hypothesis to acquire a distinctive meaning which it has not hitherto borne and the value of which we can now estimate. The older meaning referred usually to the Kantian distinction of noumena and phenomena and to the doctrine that the universal form is imposed on phenomena by the faculty which apprehends them. The relativity of knowledge now means that the intellect as a mode of subjective apprehension is a direct outcome of the evolution of life, and that it is distinguished from other modes by the nature of the limitations and inhibitions it imposes and by the selection which these limitations and inhibitions effect. It means on the side of knowledge that the outlines and characters and qualities which give the external world its objective aspect are not inherent in the reality apprehended, but are the result of a subjective selection. The discontinuity of things and the continuity of space and time are not positive discoveries, but negative results effected by inhibitions. The reality we discern in the world presented to us owes its definition and its positive character to the reality we are prevented by a natural disability from discerning. Let us look first at the biological, secondly at the epistemological, basis of this new concept.

Biology points in the clearest manner to the conclusion that, throughout the whole range of life, knowledge wherever it is a factor is relative to some particular mode of activity. Excepting in man there is nowhere the slightest indication of an exception, nowhere is there any reason to think that knowledge has appeared in the form of disinterested contemplation or useless luxury. Is man an exception? Nothing

in his structure, nothing in the comparative anatomy of his brain would lead us to think so. When we consider his mentality, however, there appears a certain detachment in his intellectuality which makes his knowledge seem to transcend utility and to be independent of any vital function. Does biology support the view that man possesses disinterested knowledge? There are two characteristic biological distinctions of the human species, speech and manipulation. From the comparative biological standpoint everything which indicates the superiority of man, and justifies us in placing him at the highest point of evolutionary achievement, is his exclusive possession of these two faculties. The distinctive conformation of the human animal structure is subservient to these two functions, and comparative neurology indicates that the human brain is organised to integrate and control them effectively. When we turn from these structural developments in man to human mentality we find that its special characteristics centre round these activities. Discourse, man's discursive reason, is the basis of his whole social and political development. It distinguishes man's sociological activity from all the outwardly similar or superficially analogous activities of animals which live in communities. Also man's manipulating activity, the power of using his hands, has given him the power over the material world which has enabled him to fashion tools and contrive external instrumental utilities which have increased disproportionately the control of his environment. It is clearly unscientific, and in the highest degree irrational, to suppose that these two great distinctions of man, discursive reason by the medium of articulate speech, and the manufacture of tools by manipulating matter, were chance inventions which any living crea-

ture illuminated by the light of reason might have hit upon. If we take evolution as an interpretative principle, it is more than ever illustrated in these specially human acquirements. The evolution of man has been specially directed towards the exercise of these activities. Biological evolution has produced in man structural and functional adaptation to discursive and manufacturing activity. These two adaptations give human action its intellectual character and condition the cultural life of humanity.

Let us turn to the epistemological basis of the new concept. A first reflection on the perceptive and logical processes of the mind reveals to us that knowledge, at least in its first intention, is not theoretical illumination, but practical guidance. When our sense organs are receptive, and our minds attentive, we are not pursuing truth or constructing science, or even accumulating information concerning the reality of the external universe, and yet we are certainly consciously aware of our environment. We are in fact in our mere sense awareness in a precisely analogous position to that of any other conscious creature in the animal scale; we are aware of just those impressions which we are structurally and functionally fitted by our evolution to respond to. We perceive around us the objects of the world presented to our mind as images. The impressions of the various senses—sight, hearing, taste, smell, touch—assume pictorial form, evoking in us a responsive attitude and preparing us for coming action. Whatever may be the case with the lower animals, man certainly is not content to remain at this natural stage of conscious awareness and responsive action. Man is a creature who reflects and who seeks to interpret his experience and, so far as appears, in a way which no other creature can or does attempt. Is this,

then, mediate or secondary knowledge which man acquires of the nature of illumination? Does it raise man above the utility concept and make him a disinterested contemplator of reality? The limitations of our knowledge show us definitely that it does not. The mental activity which compels us to go behind immediate experience in order to find the ground of sensible phenomena never frees us from the necessity of presenting that ground of the sensible in the imagery of sense. We have no other means of expression. Try as we will to think the ground of sense imagery without having to create new sense imagery to give expression to our thought, we fail, and our failure is due to a natural disability. What are we to conclude from this, but that the ideal and logical range of the human mind is no more than an extension of that mode of active apprehension which evolution has created in the human form?

The new conception of the relativity of knowledge, means therefore, not only what the old conception expressed, the necessary relation between subject and object, knower and known, implied in knowledge, but that the human mind with its intellectual mode of apprehension is an outcome of biological evolution and relative to the living activity for which and by which it is created.

II. The Schematism of the Sciences.

If knowledge is relative, in the meaning that the human intellect on its active side and the aspect which reality assumes for it are alike the outcome of biological evolution, it is clear that the conception of science as discovery and of truth as correspondence of idea with reality must be completely superseded. What, we have to ask, is the nature and meaning of the characteristic

human effort to understand and interpret experience? It is intimately part of man's practical activity. No normal individual is satisfied to take the world in its immediacy as a sense experience, any more than he would take the words of a language in their immediacy as distinguishable sounds without seeking to interpret their meaning. Yet there is only one way of going behind sense experience, as there is only one way of going behind words to discover meanings, and that is by a constructive activity of the mind itself. If we could inspect the meanings of words independently of the words and test their correspondence we should have no use for language. In like manner, if we could inspect the reality of the world independently of our ideas of it, and compare the reality with the ideas to assure ourselves of their correspondence, we should have no use for knowledge. Science is not representative of reality. It does not arise out of natural curiosity or out of a transcendent love of wisdom. It is not the result of a yearning for insight into the hidden sources of existence. It is purely practical in its motive and in its goal. It is man's endeavour to increase the range and efficiency of his control of his activity. From the standpoint of evolution the utility motive is inseparable from human science. This does not mean that scientific results are foreshadowed in man's evolution; it means that the particular advantage to life which man's intellectual mode of apprehension and intellectual form of action, rendering possible or viable the pursuit of science, has achieved, is part of the evolutionary end. Science is the scheme or diagram which man constructs, his working model of reality, verified by the pragmatic test of workability.

Let us come at once to the profound difference between the new concept and the old. Take, then, as

our example the science of physics, or what we ordinarily speak of generally as physical science. Its subject matter is in no doubt. It has always been taken for granted that the external universe in space and time, the universe in which every individual observer conceived himself to be situated, itself provides man with the matter of his investigation. His business in physics is to observe, measure and classify natural phenomena with such means as he finds himself possessed of. This scientific measurement is a science distinct from physics, a science of mathematics, and mathematics has always been regarded as an abstract science of relations dependent for its practical application on the concrete reality studied in physics. Moreover mathematics and physics have always been regarded as separable in the sense that the truth of mathematics is in no way dependent upon the existence of the material to which it is applied in physics. The principle of relativity completely reverses this position. According to this new principle there is no physical science except that to which mathematics supplies the existent subject matter. Man by his own activity in measuring supplies to physics the universe to be measured. This is the paradox of relativity. It is no easy task to adapt it to our ways of thinking. What concerns us now, however, is to show the way in which the new concept is forced upon us by fact. When we are able to grasp its meaning we see that it is the plain interpretation of evolution and its natural consequence.

The two essentially modern scientific concepts, the stellar system and the atomic system, will serve as illustrations. When we to-day look up into the starry firmament, there is probably no difference whatever between our actual sense experience and that of our

remotest ancestors who first appeared on the earth in our characteristic human form. Yet our ideas of the stellar universe, the conceptions of worlds in space, which connect so directly with our perception when we look at the sky, have no kind of identity with theirs. Our knowledge of the stellar system is not fanciful, but scientific. It does not rest on any sort of doubtful basis, such as, for example, the Christian or Indian theogonies. What, then, is this scientific knowledge? Have our minds found means to look deeper into the nature of things, to get behind the sensible world and behold the real world? To a certain extent it may seem so, inasmuch as we have invented aids to sense perception, for example, telescopes. These, however, have merely extended our visible range. They have not penetrated behind the veil of sense imagery. Our conception of the stellar system has clearly not been reached by insight, but by logical construction. Take the simple case of movement; it was not by observation and discernment and discrimination that we discovered that the sun was not moving; it was by constructing a scheme, or working model, or mathematical diagram, that we reached the conclusion that the movement of the sun which we really perceive is appearance and that there is a movement of the earth, which we cannot and do not perceive, and which yet is real. It is not the case that primitive man saw confusedly what we see clearly. In the development of our purely animal mode of apprehending reality with a view to efficient activity we have forged an instrument which has given us a practical advantage and enormously increased our control. Our science gives us the advantage of an instrument. It is purely practical. Our intellectualised conception of the reality does not place the stellar masses in our control, but

it gives humanity distinctly a vantage position in its activity.

The principle is still more strikingly illustrated in the modern concept of the atom, for in this case the intellectual mechanism of the constructive process is undisguised. The old concept of the atom was simply the attempt to think a limit to divisibility in a solid unit; the new concept starts with the phenomena of light and heat and sets to work to compose an energetical system which will yield the required result. In the quantum theory we have a beautiful example of the schematic character of the conception. The electronic disturbance which was postulated to account for the emission of light would have explained a continuous spectrum. As the spectrum was found not to be continuous, but on the contrary to separate into a definite number of lines, it was necessary to postulate that light is emitted in discrete quanta and so far admit an apparently irrational principle into the electronic scheme.

III. The Sciences Do Not Themselves Form a Unitary Scheme.

Perhaps the most distinctive feature of the speculative scientific and philosophical thought of the nineteenth century was the absolute confidence that all the subject sciences, that is, all the sciences pursued objectively, whether physical, biological or psychological, would prove to be continuous and deducible from simple elementary principles. The hitch was pronounced in biology, and still more so in psychology, for life and consciousness could not be brought into the mechanistic scheme, and yet it seemed eminently irrational to suppose that this pointed to a real discrepancy; it could only be due to our failure to discover the con-

necting links. The ideal of a philosophy of science, as first Auguste Comte and then Herbert Spencer strove to realise it, has proved absolutely delusive, and in science as in philosophy a new and different principle of the unity of nature is being advocated. The primary fact is that man is an observer of the phenomena of nature attached to a particular system of reference and a condition of his efficiency as an agent is a co-ordinated universe. It is man himself who co-ordinates his universe. From the absolute standpoint no two individuals can conform, but the fact of discourse has made it possible for man to neglect individual differences and regard his universe from a common human standpoint. The principle of relativity, the recognition that the norm or standard or criterion of ultimate reality is not imposed upon us by the objective universe from without and on its own account, but is the inalienable possession of the personal, self-centred agent, that we ourselves create the forms to which we must conform, has given new dignity to the individual.

CHAPTER IX

PERSONALITY AND THE PROBLEM OF SURVIVAL

The theory of evolution has a curiously distorting effect on the conception of human personality. We are self-conscious minds, apperceiving monads, able to say, "I think, therefore I am." This monadic nature appears to invest our individuality with a value which is absolute, however comparatively insignificant. It is the affirmation of our indefeasible reality, of our percipient experience, and of our effective action. The concept of evolution, on the other hand, makes our individuality appear of very secondary account, inasmuch as it presents our life to us as the mere momentary expression of a reality which itself is not individual, but a universal, continuous, enduring activity. Yet although the concept of this universal life-activity throws our personality into the background of its perspective, it does not diminish or affect adversely the absolute value of our individuality. The theory of evolution does not make our individuality an appearance or illusion, it does not take us out of ourselves to lose us in an ocean of active becoming, it does not merge us in a mystical union with God, it does not present to us a concept of existence in which individuality is transcended or in any way superseded. On the contrary in a very definite way the theory of evolution emphasises the fact of individual existence and enhances the value of the individual. Life only exists in living individuals. Humanity is not something we

individual men represent for the time being. We are humanity, its very substance. Were a world-wide catastrophe to involve the death of all living human beings, not merely all individual men, but humanity would cease to exist. Life has often been compared to a tree, and individuals to the leaves which it produces and sheds when their work is done, but at this point the analogy breaks down. When the leaves of a tree die the trunk and roots remain, guarding the life-preserving sap which will enable the tree to bring forth new foliage. When a man dies he does not fall away from a trunk which continues to live. Each individual is the outcome of a formative past stretching out behind him in an endless vista, yet this past does not live independently of him; it exists in him alone, is borne along in his life in which it is wholly bound up.

The aspect of the living world raises a curious and peculiarly disconcerting problem alike in science and in philosophy. In the fact of life we encounter a fundamental discrepancy between what philosophers distinguish as essence and existence. The living world exists in the various individual activities which are being exercised at the actual moment which is present. Nothing exists outside this moment, and, were the individual activities of the living world at this moment to cease, life itself would cease. Yet the essence of life, the factors which are the causal efficients of its present activity, which determine in each individual the form and range of activity and which direct and control the character and the goal of the individual actions, all lie outside its existence. The springs of my activity are in the past, the consequences of my actions are in the future, and these factors are the essence of my activity.

The same problem presents itself, although in a different form, when we consider the personality of the

individual. Personality depends on self-consciousness, and self-consciousness is consciousness of the continued identity of the self in the actual moment of existence. Consciousness is always present and of the present. I am not conscious of the past or of the future in the primary meaning of consciousness. I may remember the past, or be able to recall it in imagination, or to reconstruct it in idea, also I may anticipate the future, but I am only conscious in and of the present. And yet the essence of the self of which I am conscious in self-consciousness is completely outside my present existence, and this makes my consciousness appear as merely a fitful illumination of the actual point-instants which I seem to be traversing in my life-journey through space-time.

The old problem of immortality has assumed in the light of the evolution theory an entirely new form. Both in philosophy and in science it has become a problem of the conceivability and rationality of the survival of personality. Evolution is primarily process; and substance, whether conceived statically or dynamically, has lost for us its fundamental character. In pre-evolutionary speculation the problem of immortality took two forms. Either it was a metaphysical doctrine founded on the nature of the soul, or it was a belief supported by a moral argument and based on ethical and religious concepts of value. The two typical instances of pre-evolutionary immortality doctrines are the Platonic doctrine of the natural immortality of the soul and the Christian doctrine of the resurrection of the body. Plato held that knowledge is reminiscence, and this doctrine implied that the soul had pre-existed its present state of union with the body. The Christian doctrine arose as part of the Messianic idea. Those who had died in hope of the Kingdom

would, it was believed, be raised miraculously at the Lord's second coming to enjoy with the faithful the reign of the Messiah. Later it developed into the belief that all who had lived would rise again at a day of judgment to give an account and receive their due from the moral governor of the universe.

Let us look at the particular speculative interest which the evolution theory has brought to the problem. First, then, it has obliterated the old distinction between soul and body. It is still possible to hold, and many in philosophy and in science do hold, that soul and body are substantially separate and that the fate of the soul is in no way bound up with the fate of the body. The two-substance theory as it was propounded by Descartes and adopted in some form by most of his successors, and the different theories of the transmigration and pilgrimage and habitation of the soul which have entered into the religious creeds of East and West, may be true, but since the coming of the evolution theory it is no longer possible to base them on a necessity of thought. Organic evolution does not impose on us the necessity of conceiving a twofold development along separate lines, the evolution of a structural body and the development of a functioning soul, and it does not require us to rationalise the union of soul and body by theories of psycho-physical parallelism and pre-established harmonies. Structure and function develop, not *pari passu*, but continuously as one creative evolution. The problem of the union of soul and body has changed for us into the problem of the nature of individual agency, and a very curious speculative problem it is. If I consider myself—the individual I know intimately and from within—as a product of evolution I see at once that my actual existence consists in the continuity of my action from moment

to moment. My nature is to be forward-looking. I adjust myself continuously and automatically to an attitude of attention to coming action, I hold myself ready to determine my action according to the circumstances of the situation. I retain the past in memory as it slips behind me and I have the feeling that it is irrevocable, I feel also that in the present I am free and that the future is open before me. To exist, or rather to be conscious of existence, means to be conscious of directing and controlling in the actual present moment of acting my living organised body. I do not feel that something I call my soul is making use of something I call my body. In the actual moment of experience I make no distinction of soul and body. Now there comes the evolution theory to teach me that this actual momentary, soul-directing, body-acting existence is the outcome of a history which has no beginning, the inheritance of a past which has no efficiency, the exercise of an impelling force which, immanent in me, has adapted and is adapting me to respond to varying conditions in specific modes. And so I myself come to appear to myself as the concentration, within an instant of intensive existence, of a reality which overflows the point-instant of its actuality in every direction. How can I help asking what it is which is really going forward in my momentarily enduring existence? Am I really leaving behind me at every moment something of myself to pile up on the dead past? Is this stupendous reality of the past, which determines my present, which endures in my memory and which is by my activity forming the future, satisfied to exhaust itself in the finite moments of my efficiency? Or is the momentary nature of this existence illusion? Am I, not a dying, but a deathless reality? May the reality be hidden from me as it was from Balaam in

the old world story: "And the Lord opened the mouth of the ass, and she said unto Balaam, what have I done unto thee that thou hast smitten me these three times? And Balaam said unto the ass, Because thou hast mocked me. . . . Then the Lord opened the eyes of Balaam, and he saw the Angel of the Lord standing in the way, and his sword drawn in his hand"? May not evolution itself have wrought this blindness in us, have contrived our inability to see the reality of our own existence lest the vision should turn us aside from the task we are intended to perform?

There is yet another important respect in which evolution has changed the problem of personality. The progress of modern biological science has rendered meaningless the old almost universally accepted distinction between the part played by the male parent and the part played by the female parent in the process of sexual reproduction. The father it was thought was the begetter, the mother the conceiver, of the child. This led to the idea that direct descent is through the father, the mother providing from her body the necessary nutriment for growth and the necessary protection for the foetus during the formative period. The accepted notion made it comparatively easy for philosophers to affirm the substantial identity of the individual throughout the whole line of its pre-natal ancestry. It enabled theologians to rationalise the dogma of original sin, for all his posterity was present, not merely potentially, but substantially, in Adam when he transgressed the divine commandment. Among literary curiosities is St. Paul's use of the idea, in his argument that Moses was existent in the loins of Abraham when that patriarch paid homage to Melchizedek. The science of embryology has no doubt brought to light more new problems than it has set to rest old controversies, but

at least it enables us to say with absolute assurance that the ancestry of every individual human being divides at each generation into two independent lines, and that the same is true of the succeeding generation. We cannot transmit our personality except in so far as that personality is a factor in that union of two individuals which will produce the new individual of the new generation. What gives identity, unity, and continuity, what in a word gives personality to our individuality from the moment of birth, through infancy, childhood, adolescence, maturity and senility, to the moment of death is a function of our individuality. Personality is peculiarly our own, not received from our ancestry nor bequeathed to posterity. And yet this personality is the one thing we care about when we wonder whether our survival is a scientific possibility and rational expectation.

There is a doctrine of immortality which has been founded on the conception of the monad itself. This was Leibniz's original theory and it has been revived in modern speculative philosophy. It is particularly relevant because Leibniz conceived substance dynamically. In his view there is nothing dead in the universe. Immortality is, therefore, consistent with activity, life, process. He argued that the monads being simple substances are indestructible. It is only the body, a compound into which these indestructible units enter, that is capable of disintegration. He argued also that the monads could not be conceived as being born and dying, as coming into existence and going out of existence, and therefore they are not subject to birth and death. They could only, he said, have come into existence all at once by an act of creation, and they could only perish all at once by an act of annihilation. By this he meant that the world which consists of the

monads could only be created as a world and annihilated as a world. We need not consider the value of these arguments, important as they are in philosophy, for the idea of immortality which depends on the concept of substance does not touch the crucial problem of the evolution theory. What is important from the standpoint of evolution is the dynamic aspect of the individual as the receptacle and vehicle of the living impulse, and what is important to the individual himself is not the question: Am I indestructible and therefore immortal? but the question: Is this activity which exhausts itself momentarily in my experience, between birth and death, the be-all and end-all of my personal existence?

It is this aspect of life which gives interest to the modern problem of the survival of personality. It is not mere idle speculation. It does not spring from an insane desire to continue living under any conditions. The nature of individual activity, the sharp-pointedness of our personality as it inserts itself in reality, the psychical inheritance which enters into and determines individual actions throughout the whole living world, the passage of this psychical inheritance from generation to generation—these are the facts which evolution has forced on our attention, and they make it impossible to regard the reality of the individual agent as simply exhausted in the behaviour of a structural configuration during a finite life process. The mystery of evolution is not consciousness. Life seems able to dispense with that altogether, and whenever in fact consciousness is invoked, it is only for a utilitarian end. The real mystery of evolution is individuality. Wherever life exists it exists in living individuals and in no other form. This is so wherever we are able to detect the presence of life. It may be different in other

planets, but as far as human experience extends there is no exception on this planet.

It is not my purpose to discuss the value of the kind of evidence which has been collected for many years by the societies for psychical research. Many trustworthy students of what are called spiritistic phenomena are satisfied that there is direct evidence that the personality of a deceased individual may manifest itself to living persons in a way which makes it practically certain that the personality has survived death. It will be generally admitted, however, even by those who are themselves satisfied, that so far no belief-compelling evidence of survival exists. In any case it is clear (and probably this would be admitted by everyone whose testimony counts), that if our personality has pre-existed our birth or does survive our death, in the form in which it exists during our life, the economy of our organisation, both mind and body, is so disposed as to conceal from us the fact, and our ignorance therefore must be regarded as part of the purpose of the creative evolution which has developed the human mode of activity. No man of genius among those engaged in psychical research has yet proposed a possible and infallible test of the concealed fact, if survival is a concealed fact, comparable in any way to any one of the three tests which Einstein proposed for the concealed fact of physics, the equivalence theory of gravitation.

There are two indirect arguments, one based on the nature of matter, the other on the nature of mind, which, by demonstrating the conceivability and rationality of the idea, endeavour to raise the probability of survival to the highest possible degree. The first is the argument which Sir Oliver Lodge has founded on the discovery of the electrical constitution of matter. The second is Bergson's doctrine of the spirituality of

memory and of the function of the brain in controlling motor mechanisms. Neither offers a direct proof of survival, but Bergson claims to have raised the probability so high as practically to throw the *onus probandi* on the defense.[1] I will consider what is essential in each of these arguments.

I. The Physical Argument for Survival.

Physical theories of the possibility of personal survival are modern, but not specially recent. They go back at least to 1875, the year of the publication of Balfour Stewart and Tait's *Unseen Universe*. A physical theory of survival is simply a speculative idea based on our discoveries of the nature of physical reality. Human life is a phenomenon of material organisation. Human activities, whether they are the ideal activities of the mind or the spatio-temporal activities of the body, are ultimately dependent on matter. Matter has hitherto been the general term used in philosophy to denote adverse occupancy of space, space being considered quantitatively as infinite extension, qualitatively as pure emptiness. For science, matter has been conceived as "mass," a vague term intended to imply a substratum of sensible qualities itself independent of them and possessing the purely passive quality of mobility. "It seems probable to me," Newton writes in the *Optics*, "that God in the beginning formed matter in solid, massy, hard, impenetrable, movable particles." Scientific men generally, until the formulation of the electron theory, had been content to assume space, time and matter in the Newtonian meaning, to be ultimate realities. The modern theory starts with the discovery of the electro-magnetic nature of light. This led to the further discovery that

[1] *Mind-Energy*, p. 79.

mass is not constant but variable, that the geometry of space could no longer claim to be absolute, that matter is a form of movement, and that its special properties depend on the structure of movement systems. And now it has come to be thought that matter in its nature and origin is not ultimate, but a vortex formed in a perfect fluid or frictionless medium. The medium has been named ether; matter is a deformation of it, a knot or kink in it. We need not concern ourselves with the conceptual difficulties of the ether theory, nor with the failure of all experimental attempts to detect positive effects of its presence. These failures may in a certain way be said to add force to the speculation of the survival of personality, for if science can affirm the reality of an ether in spite of the fact that it defies all attempts to find experimental proof of its existence, it would seem to follow that if personality be dependent on this ether the absence of positive evidence of its survival is no ground for rejecting the theory that it does survive. However this may be, the argument itself is clear and may now be set forth in definite terms.

1. Matter is a mode, not a substance, an effect not a cause. Mass, the form in which it is apprehensible to sense perception, is a function of movement. The existence of matter implies substance and force. In physics the ultimate antithesis is motion and rest, not matter and void, not something and nothing. The ultimate concept of physics is a reality which, undisturbed, is neutral and uniform; disturbed, produces mechanical effects.

2. Ether is a hypostasised reality, it is not subtle matter. It is not discovered nor discoverable by sensible perception. It is the correlative concept necessary to give consistency to the concept of matter as a mode.

3. A human being is a material phenomenon. The body on which all individual activity depends is composite, discrete and discontinuous. The living body is a functional or organic unity, but there is no fixity in the material constituents. Throughout individual life there is continual give and take, an unceasing exchange between the organism and the material world of which it is part.

4. Personality is an ideal or spiritual, not a material, reality. It gives identity and continuity to individual experience. It is self-hood—one, indivisible, indecomposable.

The hypothesis of survival is based on these conceptions and interpretation of facts. The argument is that personality, though immaterial, manifests itself in and to material organisms only in relation to matter. It is itself ideal and not conditioned by matter, and must, therefore, it is urged, have its own conditions in the ether. If we accept this interpretation, then there is no scientific principle contradicted in the assumption that personality with its accumulated store of spiritual experience survives integrally the disintegration and dispersion of the elements of the body. It would presumably exist only under—to us—unknown ethereal conditions. Its manifestation to material conditioned organisms would be in any case very exceptional, and the possibility of such manifestation extremely problematical.

The attraction of this hypothesis to the many leading physicists of the present and past generation, who in some form or another have adopted it, is not purely sentimental. If it could be proved experimentally or conceptually it would give intellectual satisfaction of the highest value. The principle of the organisation of personal experience would still be as mysterious as

ever, but at least it would cease to be irrational. It is true that to many exponents of scientific method the whole problem of the survival of personality is suspect, and the arguments are dismissed as metaphysical, not without contempt. It is of course a purely metaphysical argument, if we accept metaphysics in the Aristotelian meaning, as των μετα τα φυσικα, for it is the attempt to complete in thought what is left without interpretation in sensible experience. The argument is, however, somewhat complicated in physics by the fact that the ether is a hypothesis around which a notable scientific controversy is being waged. The ether originally was postulated as a hypothesis to meet the requirement of the undulatory theory of light. Once postulated its physical properties were worked out mathematically, and it was then hoped by experiments to demonstrate its physical reality by obtaining positive effects. The result was that entities and forces such as "ether stream," "the drag of the ether," "ether strains and stresses" entered into physics. Ether in fact came rapidly to occupy the old position of matter and to enjoy its status. It came to be regarded as real stuff differing from matter only by its wonderful tenuity. It was not seen that such a concept was a *reductio ad absurdum,* that it was reintroducing the very contradiction to reconcile which the ether had been postulated. For if ether is subtle matter, then we must postulate a more subtle ether for the ether, and so to infinity. It required, however, the Michelson-Morley experiment with its negative results to awaken physicists to the fact that their postulate was otiose and, so far as positive effects were to be expected from it, nonexistent. It should be clear, therefore, that so far as the hypothesis of survival can find support from the concept of ether, it is ether conceived not as a subtle

matter, but as the condition of the existence of matter. The philosophic analogy is not with the ether-stuff which the Michelson-Morley experiment looked for, but with the pure condition of the existence of matter which Spinoza conceived as substance.

II. The Biological Argument for Survival.

The second of the two arguments, though indirect in the sense that it does not offer positive proof of survival, is more direct than that founded on the conception of the ether, inasmuch as it is based on the actual nature of personality. The argument is scientific, but concerned with the biological rather than with the physical order of scientific reality. It starts with the plain fact of the incomprehensibility of life in the mechanistic scheme of physics. Biology is not a science of matter and movement, and the evolution of life cannot be stated mathematically and geometrically, in terms of the laws of motion which physics has formulated for the spatio-temporal world. The reason of its incomprehensibility is that matter is instantaneous, whereas life endures. Matter is essentially the concept of simultaneous existence. It may sound a paradox to say that matter comes to existence and perishes with every instant, because since Newton we have become accustomed to the concept of evenly flowing time, but matter is essentially a spatial concept over which time has no real hold. At any instant of time, and at every instant, matter exists integrally, and the materiality of matter is the simultaneity of existence at that instant. Life on the other hand is not space-occupancy, it is time-occupancy or duration. This does not mean that life is juxtaposed or spread out in time as matter is juxtaposed and spread out in space. It is not a difference of the kinds of mathematical co-ordi-

nates we employ to measure space-time dimensions, it is a fundamental and substantial difference; matter is essentially extension, life is essentially duration.

The argument for the survival of personality is based on the fact that a person is the integral unity of an organisation of psychical experience. In this organisation, matter, the living body, plays an important and very essential part, but also a very definitely dependent part. It exists at the point-instant of progressing formative action in an ever-present now. It does not exist as past or as future. Past and future only exist ideally, not materially. When we conceive personality substantively materiality shrinks to a point which is the focus of progressing action. Past history, not present materiality, is the substance of a living being. The significance of this fact is even more striking in an impersonal form of life, such as a tree, than it is in a self-conscious person; for in the tree we find it difficult to present the image of its spiritual substance or to imagine how its experience is conserved. As a material object the tree puts forth its activity integrally in the moment which for us is the mathematical point dividing its past and future, and yet the substance of the tree is clearly not its materiality at that point. In every living form, animal or vegetable, we meet with this duality of substance, a material substance and a psychical substance, a matter whose existence is spatio-temporal and a psyche which is the essence of its reality, though not thought of as existing separately. In ourselves, and possibly in the higher animal forms, we meet with the phenomenon of personality. The human individual is a person. This means that the human being is not merely an agent performing specific actions and conscious of his activity, but a reflective self-conscious agent. A personal self is able by an act

of conscious reflection to survey and contemplate not only the actual present, but the no longer existent past; he contemplates that ideal past objectively with precisely the same detachment as that with which he contemplates the real present. His own past experience though existing for him ideally is yet open to his external inspection of it. He selects, discriminates, varies his attention to different parts of the field in precisely the same way as he surveys the field of his present action.

The particular argument for personal survival may now be set forth in definite terms.

1. A person is an agent conscious of the actions he is engaged in, of the motives determining his actions, of the goal or purpose of his actions. An individual is a person if he can by an act of reflection detach himself from his past experience and present action and contemplate himself and his activity objectively. The extent of this self-reflective detachment of an individual is the measure of its personality.

2. The normal attitude of a person is attention to life. The central point of personal consciousness is the moment of present actuality as it advances from the beginning of finite individual existence at birth to its end at death. This attitude of attention is a strained, forward-looking interest and alert watchfulness in the progressing living action. The strain varies in intensity from its almost complete relaxation in sleep or coma to its maximum in critical situations. In normal experience personality exists at the centre of activity indissolubly bound up with the forming action.

3. The disorders of personality throw light on its nature. There are cases of divided or multiple personality and there are cases of complete loss of personality which do not involve the death of the organism.

In normal experience also there occur disturbances of personality. Healthy individuals suddenly confronted with critical circumstances threatening destruction or sudden death, persons resuscitated from drowning, have described their experience as a reversal of their normal attitude of attention to life and the uprising before them of a vision of an integral past.

4. Personality is essentially related to memory and existentially related to the organism. Memory cannot exist in detachment from personal experience and it exists in the subject of activity at the actual moment of activity. Memory is a factor in personal agency. Yet a person may suffer loss of memory and in such cases memory appears detachable from personality in whole or in part. In normal experience there is the phenomenon of forgetting and of recovering by special effort indistinct or lost recollections. In amnesia long periods or even the whole past may be temporarily or completely cut out of a person's experience, yet the detachment is not existential separation. Lost memories do not float off on their own account. It is the person who has lost consciousness of them.

The strength of the argument for the survival of personality lies in the perception of the *essential* nature of the relation between personality and memory and of the *existential* nature of the relation between the person and the organism. The essence of a person is the enduring past; his existence is the changing present. Of course in the sense that the past is unchangeable, that what was is unalterable, a man, though he is born and dies, is immortal, for he is woven into reality's web. But this is not the immortality which is the satisfaction of our quest. What we are in search of is evidence, or, if not evidence, rational ground for believing that our personality whose activity is diverted at

death may continue after death effectively inserted in the actuality of the present. This is entirely different from the Platonic doctrine of the natural immortality of the soul and from the Christian belief in a miraculous resurrection of the body. It is consistent with the Pythagorean doctrine of transmigration, but it is in reality a completely new orientation of a scientific speculation.

The argument for survival is in effect a new hypothesis based on the facts which have given us the theory of organic evolution. The human form of personality is an outcome of evolution, but it appears at the end of a line and as the goal of a striving. It is true that it appears only as a heightened individuality. It does not transcend animality; it simply transforms it. It endows the individual man with a power of detachment, a power of rising superior to material conditions, of ruling them and making them instrumental to his purposes, thereby enormously increasing his efficiency. In man's personality life has attained to a form of self-determining freedom. We are entitled to ask then, Does this new attainment point to a still further possibility, the possibility of surviving bodily disintegration, or, must we think that death determines personality and a man dies as a dog dies? The dog like the man has all the mystery of individuality, but so far as discourse of reason, knowledge and foreknowledge, reflection on birth and death, in a word, detachment of thought from life, are concerned, dog and man as persons have no common ground. If an individual dog survives the finite duration of its life, such survival has neither meaning nor value from any standpoint of dog-consciousness we can conceive. On the other hand if man dies as a dog dies, then we must conclude that life in endowing man with personality has made him

the victim of an illusion. It has evolved a mode of activity which, whatever advantage it has secured to the universal life activity, has brought only deception to the individual. May it not be, however, that man's personality is a real triumph of evolution? May it not be that in man life has found the means to carry forward living action by the individual in complete detachment from the material conditions of individuality?

The whole problem of the possibility of personal survival reduces itself, therefore, to a question of the rationality or otherwise of an hypothesis. Death is the end of the body, the material organisation to which throughout life the enduring psychical organisation has been firmly anchored and which has been its effective instrument of action. This material organisation so far as its matter is concerned has existed momentarily; its continuity from moment to moment has been only formal, like a wave which preserves its form as it moves over the sea. The psychical organisation, on the other hand, is a real duration, deriving its content not from a chance assemblage of constituents, but from a life activity which is one and universal. Of this universal activity it has been an individual embodiment. In humanity this individualisation is highly personalised. Are we, or are we not, justified in believing that this personalisation indicates a detachment of individuality from material conditions? It has been suggested (Bergson) that one end towards which the striving of life seems to be directed is to overcome the barrier or obstacle of death, and it may be that in the human mode it has succeeded or at least registered a great step forward to success.

CHAPTER X

THE NATURE OF HUMAN FREEDOM

"He planteth an ash, and the rain doth nourish it. Then shall it be for a man to burn: for he will take thereof and warm himself; yea he kindleth it and baketh bread; yea he maketh a god and worshippeth it."

ISAIAH xliv., 14.

It was a very common device of authors, before the idea of evolution, to divest human discursive reason of any necessary connection with the human body and its function, and to imagine it bestowed indifferently on any animate or even inanimate form. When Captain Lemuel Gulliver visited the country of the Houynhmns, in Swift's immortal satire, we are told that the worthy and excellent inhabitants were horses endowed with reason, while the humans were Yahoos, brutish men. Neither Swift nor his reader saw anything incongruous, however comic, in the description of the mistress of the household sitting on her haunches with her young foals around her, engaged in sewing, dexterously holding the needle and thread between the hoof and pastern of her forefoot. It was imagined that reason is identical and would take the same form wherever it appeared. It did not occur to anyone that reason in a horse would be specifically equine, in a cat specifically feline, in a dog canine, in a man human. This does not, of course, blunt the edge of Swift's satire, but it affords a curious illustration of the old mode of envisaging the use and abuse of reason.

The problem that the evolution theory raises in

regard to human reason, and its objective expression in human civilisation, goes to the very basis of the philosophical concept of reality. Let us look first at the fact and then attempt its interpretation. Man, at the present stage of cosmical and biological evolution, is the dominant species of living animal forms, and has established his supremacy in a manner which, so far as the evidence of the geological and zoological sciences is concerned, is absolutely unique. When we study human nature comparatively we feel its characteristic quality to be rationality. It is not necessary to suppose that intelligence, the power of idealising purposive actions before their realisation, is peculiar to man, but it certainly exists in man in a degree which surpasses anything within the scope of other living species, and also, what is still more significant, it takes in man a form which is unique. Man alone has superposed an artificial life on his natural life. No other animal except man has done this, and apparently man has done it of his own initiative and not in consequence of the life force which has directed the transforming of his organisation. Man, that is to say, not man's civilisation, is the outcome of biological evolution. We may find abundant instances of forms of life, animal and vegetable, which, meeting favorable conditions, have multiplied and secured thereby a certain supremacy, but man is the only one of the animals who has found the means of establishing himself artificially in despite of unfavourable conditions. It is on this account that we distinguish man from other animals as rational.

What, then, is reason in man? In the pre-evolution period the answer appeared direct and self-evident. Reason was the effect of enlightenment; it arose out of knowledge; it revealed itself in man's power to distinguish the real from the imaginary, to detach the

object of desire from the appetite. It consisted in self-knowledge and world-knowledge. The theological interpretation was that the creator had assigned to the lower forms of organic life the instinctive dispositions necessary to their preservation, but to man he had given the enlightenment of reason that his actions might be free. The scientific interpretation was not essentially different. It was supposed that man by conscious reflection on experience was able to know. Man's intellect was essentially enlightenment. This enlightenment was always conceived as ultimately consisting in the distinction between the self and the world and in the apprehension of the complete detachment of the two realities. So man's reason was a function of man's knowledge and his knowledge a function of his insight. Knowledge in man was relative to man only in the sense that man's range is limited and his life finite. In the pre-evolution period there can hardly be said to have been a possible alternative. Before we consider the alternative which evolution presents to us, however, there is a philosophical aspect of the problem which is both pertinent and highly important.

When Laplace made the famous reply to Napoleon, who had asked him what place he assigned to God in his *Mécanique Céleste,* "Sire, I have no need of that hypothesis," he was not merely declaring the uselessness of conceiving a mythical personality as creator and sovereign ruler of nature, but he was affirming explicitly for the first time the possibility of conceiving the universe in its abstract objectivity. At the same time he was unintentionally conjuring up the epistemological problem in a form it had not until then assumed. The scientific realism of the present day differs from the realism of the older philosophy in this most important particular, that it abstracts from the subject-

object relation in a way which was inconceivable when God was regarded as universal reason. The real or intelligible world, which the old philosophers distinguished from the sense-perceived world; the truth, which they distinguished from opinion, was the world which an omniscient God knows, as distinct from the same world as a finite creature apprehends it. Newton, long before Laplace, had formulated the theory of an absolute space and time as the framework of the material universe, but he had also conceived this space and time as God's sensorium. By this he meant, not that God was conditioned by space and time, nor that space and time were dependent on God's existence, but that absolute space and time fulfilled for the divine or infinite intelligence the same function which our cerebral receptive organ fulfils for us in regard to influences which, passing through our sense organs, become perceptions of external objects. So that even for Newton, who formulated the principle of the independent reality of the material universe which science has ever since postulated, and who would have rejected with horror the identification of God with the universe or of the universe with God, there was notwithstanding a complete subject-object relation bound up in the very idea of existence. The absolute of physics for Newton, the real world, was the world as God knows it, and it was absolute because no existence is unknown to God. We get the same fundamental subject-object correlation as essential to the concept of reality in Berkeley's philosophy, with the difference that the emphasis is there on the subjective aspect of the correlation. The absolute *esse* for Berkeley is God's *percipi*. It is in Kant that we have the idea of an absolute existence independent of any knowing relation. It was explicitly formulated by Kant for the first time in modern

philosophy in the famous theory of the unknowability of things-in-themselves.

This conception of objects of knowledge as things-in-themselves, though a postulate of physical science, accepted as a necessary assumption and unchallenged till quite recent times, has never succeeded in maintaining itself in philosophy. The logical self-contradiction in the simple formulation of the theory was made explicit by all the post-Kantian schools. Many of them indeed started with criticism of the theory, and rejection of the theory in the essential form it had assumed in Kant served as their jumping-off ground. In science, on the other hand, the concept of a reality existing independently of knowledge was not only regarded as a necessary assumption, but throughout a long period of progress in research it has been considered the basis and *raison d'être* of an investigation and the sole justification of the experimental method. Its effect is seen in the metaphysics of science, a metaphysics which has been practically universally accepted up to the coming of the principle of relativity. It postulated, as the ultimate reality of the physical universe, masses of matter vaguely conceived as formless stuff, possessing primary qualities, wandering aimlessly in a uniform, infinite, or at least indefinitely extended, space and time, subject only to a rigidly mathematical order. Life and mind it assumed to be temporary phenomena which had made their appearance under rarely occurring conditions. The physical universe, it affirmed, had existed aeons before man and his mind appeared to apprehend it, and would continue to exist when man and his mind should have disappeared.

The theory of evolution has turned this metaphysics to foolishness. It had seemed indeed to the pioneers of

the new principle that its effect must be to establish more surely the ultimate materialistic and mechanistic nature of the universe. Even life and mind it was said can now be comprehended under laws of matter and movement. The fundamental fact of continuous, orderly, progressive, evolution was itself, it was thought the revelation of a mechanical, geometrically conceived order. Evolution was in fact to its first apostles the crowning proof of the metaphysics which physics had postulated, but which so far had failed to account for life and mind, save by bringing to its aid a theological hypothesis. A profounder grasp of the evolution principle has shown that it is inconsistent with mechanistic interpretation itself. The solid ground which materialism seems to provide science as the sure basis of its lasting structures dissolves and vanishes at the touch of the evolution principle. For if we accept the evolution of life as fact, and carry the theory of this evolution to its logical consequence, we must conclude that, in apprehending the universe as a spatio-temporally conditioned material world existing independently of our psychical activity towards it, we are in fact responding to the psychical disposition which evolution has created in us. If there be the slightest doubt as to whether it is we who are responding to our evolution, or evolution which is submitting to a fiat imposed upon it by the material world, when we hypostasise space, time and matter, a glance over the living world should at once and finally dispel it. The mode of consciousness of every living creature is specific, and there is always correlation between organisation for action and objective range of activity. If we are faithful to our principle, can we suppose that we ourselves are an exception, that when man appears, the outcome of evolution, there is a sudden change, that with man

there springs into existence what we have heretofore seen no sign of, a reason which is not economic, but pure enlightenment? Clearly, to suppose so is to be false to the principle we have chosen. Our rationality is an outcome of evolution, as definite and determined in its form as the structures which are the condition of our functions.

The mode of consciousness which we call intellect, the mode of action which we call rational, are then distinctive of human nature, and, as we have seen, they are the clue to the supremacy man has established and the domination he exercises; and also, if we are right, they are the outcome of the evolution which has progressively transformed him. What, then, is it which evolution has achieved in the production of the human mode of life? The answer is not doubtful. Man enjoys a wider freedom than any other form of living activity. Our task in philosophy is to interpret this freedom, to make explicit its nature, its extent and the end to which it is directed. It is in freedom alone that man excels, other species are stronger, swifter, more alert, and even more resourceful, but man is able by his freedom to counterbalance and more than counterbalance the natural advantages of other forms of life. The comparative study of the human organic structure shows the adaptation of man's body to the exercise of this freedom. The distinguishing features of man compared with other animals, in the structural design of his body, are first, the upright posture; second, the convergence of the eyes to obtain single stereoscopic vision; third, the conversion of the forelimbs to the function of manipulation; fourth, and most distinctive of all, the development of voice and sound organs to adapt them to the production of articulate speech. These are not four independent lines of evolutionary

development; they are four characteristic directions in which evolution has moved towards the production of one single integral function. To describe this function anthropomorphically we may say it is to give man control of matter by detaching him from matter. To express the same idea in less ambiguous terms, it is to enable man to view the world in which he will act as independent of him and himself as independent of the world. All animals are dependent on material conditions and in many cases they exercise specific activities. "The foxes have holes, and the birds of the air have nests; but the Son of man hath not where to lay his head." This is not a deprivation, but a privilege. Man has no need of holes or of nests, because by his detachment he can make matter instrumental, not to his specific needs alone, but to all his purposes. By clothing himself he can become independent of climatic conditions, he can arm himself for offense and defense, he can fashion tools to construct dwellings or to provide weapons, and, strangest of all his powers, he can materialise his speech, detaching the sign from the thing signified. All these abilities are registered in his structural form. Evolution in directing the adaptation of man's organic body has rendered possible functions which allow to man a degree of freedom, and this degree of freedom is the clue to the nature of human efficiency.

The degree of freedom which man exercises is most strikingly illustrated when we compare the human form and the human mode of living with that of the species which outwardly most closely resembles man, the anthropoid ape. The ape is arboreal. Its forelimbs are prehensile, fitted for grasping and holding rather than for locomotion, and to this extent they are an approach to the human function of manipulation. But

they are only an approach. The ape can use its hands as dexterously as the human to seize or tear its food. It can handle detached objects. So far as its muscular development and the disposition of its finger bones and joints and the character of its palm are concerned, it would seem to be capable of manipulating, to a degree almost, if not quite, equal to the human, yet it lacks entirely the human mode of extending the range of its actions by constructing tools and using tools as means to ulterior ends. The difference between ape and man in this respect cannot be measured by a material standard. It depends on a psychical disposition. The difference is proportionate to the possession of a psychical power of detachment from material conditions, and this detachment is the form which human freedom assumes. It is only measurable in terms of freedom.

This psychical power of detachment from matter is still more strikingly illustrated in man's most specific character, his discursive speech. When we compare man with the ape in regard to the power of discourse, it seems probable that all the muscles and mechanisms which man uses in articulation are present in the ape, and presumably adjustable to the same function. What is different is the neurological development of the brain and the presence in man and absence in the ape of a disposition of cells in a localised area which subserve an integrating function and control articulate speech. We meet with abundant instances in the animal world of the use of vocal mechanisms and of the auditory sense for the purpose of intercommunication. We may instance, for example, the whistling of the sentinel marmot, the lowing and bleating of gregarious animals, the distinctive alarm note of the song-birds in a garden at the approach of a cat, and the sudden silence at the presence of a hawk, and more striking

still the mimicry of natural sounds and complex artificial modulations by "talking" birds. In all these there is not even an approach to that detachment of sign from thing signified, which is the distinctive character of human speech. In speech man possesses a means of expression which he can modify to an unlimited degree. He can materialise the sounds he makes use of, breaking up his expressive speech into phrases and words on any principle he chooses. He is able, moreover, by reason of the attitude of complete detachment which he can adopt towards his articulate expression, to attach the written to the spoken sign. In this way he has come to possess a literature. The same power of detachment gives to man's higher thought and rational life its extraordinary range and its marvellous directing power. It enables him to be an inventor. It enables him also to project the creatures of his imagination into the unseen spiritual world.

It is important to realise that human freedom is primarily the perfectly natural outcome of the evolution of life which has produced the human mode of activity. It is usual to regard freedom as a problem of ethics, and naturalists are accustomed to ignore it as belonging to a different order of facts to those with which biology deals. For ethical philosophers it is a problem of the nature and origin of moral responsibility. But responsibility is consequential on freedom, and moral responsibility is consequential on the development of man's social and political activities. The ethical and religious characteristics of human nature depend on the natural freedom of man, and this freedom is a biological fact. It arises in a biological necessity—the necessity of inward control of muscular action for the direction of locomotion in the case of every creature dependent on its exertion to procure its food.

This biological freedom is never absolute or unconditioned; it is always determined alike in its subjective and in its objective aspects. It is determined subjectively because the life principle has formed in each species the psychical disposition adapting it to its environment. It is determined objectively because the life principle has selected the environment for the creature's activity. Thus the fish is free to move, but its freedom is determined subjectively by the over-ruling life principle which has disposed it psychically to a specific environment, which has formed it to be unconscious of the water in which alone it is free to move, and its freedom is determined objectively by the water, the environment to which it is adapted. So likewise the bird is free to move, but only in the air; the mammal only on the dry land or on the surface of the sea.

The freedom which man exercises in his natural activity is like in kind, however different in degree or varied in form, to that of other species. It is the freedom which is inherent in the life principle itself. It is not a privilege bestowed on man by a superior power, whether that power be conceived personally as God or impersonally as Nature. It is the outcome of his evolution, registered in his bodily form. A superior mind contemplating man, capable of apprehending the whole scheme of his activity and possessed of the key to interpret his history, would be able to read off the whole extent of his freedom in his structure; and, as the brain is the integrating organ of the bodily movement, he might see in the brain alone the completeness of the body's functions. Man has no such independent standpoint from which to view himself, he can only view himself and the range of his activity from within, he cannot divest himself of self-interest; and consequently the world in which he acts must present itself to him

as alien, and his own actions must appear to him to be external interference with an independent order of events. What man has the ability to do, however, is to reflect. He can survey the pit whence he was digged, He can read the history of his evolution in the record of the rocks and in the comparative anatomy of other living species, and thereby he can estimate the progress registered in the human form relatively to other forms judged lower by his human standard. When he does so human progress is seen to be commensurate with human freedom, and man's predominance in the living world appears as the positive advantage of acquired freedom. Man's supremacy is not the result of a specific adaptation. The power to manipulate and the power to articulate are specific adaptations; they are the outcome of a progressive evolution, but the freedom which has given man supremacy and dominance appears as a novelty, a new creation, an entirely new departure. Manipulation has opened to man the possibility of tool-making and tool-using, and articulation has opened to him the possibility of discourse and endowed him with discursive reason. With man there appears accordingly an entirely new phenomenon, a living creature determined like all living creatures in the form and in the range of its activity, able to establish itself artificially and to extend its artifices indefinitely.

We are able, then, to distinguish in man his natural and his artificial freedom. The one he shares with all that lives, the other he has acquired or in some way has come to possess, by virtue of peculiar structural adaptations and the intellectual mode of action which those adaptations have made possible. From the standpoint of evolution there is no mystery in man's natural freedom—can evolution also interpret his intellectual

freedom? Man is an ethical and religious animal—can evolution provide us with a principle by which to interpret the spiritual freedom these characters presuppose? Let us state the problem precisely. It is that evolution has formed the species man to walk erect on the dry land and has fashioned his organism to a definite range of terrestrial activity; further, it has wrought in him, it may be indirectly, an adaptability of organic structures subserving distinct functions, manipulation and articulation or speech, which have enabled him artificially to extend the range and efficiency of his actions and thereby to dominate its entire sphere. Man has no organs of flight, yet he can contrive means to fly. He has no gills for aquatic respiration nor fins for aquatic propulsion, yet he can navigate oceans and devise submarine craft. He is limited in his direct knowledge to sense-apprehension, yet he can manipulate the unseen forces of nature. He distinguishes theory from practice, but also he is able to mould practice into accord with theory, even when theory goes athwart his natural experience. Such is man's intellectual freedom. As a biological phenomenon it is unique. So far as we are able to comprehend the mentality of the living world we find nothing corresponding to it, nothing seeming to approach it, even in a minor degree. If by intellect we mean the mode of representing our ends in idea before we realise them in action, in contrast to the mode of immediate, automatic, perfectly co-ordinated, ready-formed responses to specific sense stimuli which constitute instinctive behaviour, then it seems likely that man differs from other living forms, not in the possession of intellect, for intellect is not peculiar to man, but in the degree in which in man it supersedes instinct. All mentality is activity and all activity implies freedom, but there is in

man by reason of intellect a freedom which means emancipation from the limitation which sense-experience imposes on him, a power of liberating his actions from the determinate form in which he inherits them from his ancestry and of framing them on a new principle or on any new principle. Man can distinguish appearance from reality, can oppose an intelligible to a sensible world, can frame his actions on an intelligible as distinguished from an animal-sense principle. We are so accustomed to the exercise of this intellectual freedom, it is so inherent a quality of human nature, that it is difficult for us to realise the paradoxical nature of the fact itself and the peculiar nature of its efficiency.

Of the lower animals the elephant, judging by its behaviour, probably possesses intelligence, comparatively in a very high degree. This was discovered in ancient times, for it was by training its intelligence, not by curbing it with bit or bridle or yoking it like oxen, that the Carthaginians succeeded in making use of its giant strength in battle. The story of Hannibal's difficulties in transporting his elephants over the Rhone is very instructive. All attempts to induce the animals to follow the army by the ordinary methods of fording or ferrying proved of no avail, and they had to camouflage the rafts to represent *terra firma* before they could entice a single elephant to embark. The apparent stupidity of this exceptionally intelligent animal is easily explicable. Its natural distrust of an unsteady resting place or of entering a flowing river is not a mere obstinacy induced by terrestrial habits and an aversion to novelty; it is clearly a function of its bulk and weight. The evolution of its gigantic dimensions has involved the evolution of a correlative psychic disposition. Its timidity in regard to unfirm ground is a sur-

vival value. Man in his natural state is in like manner constituted and regulated by psychic dispositions which have been developed in him *pari passu* with the transformation and adaptation of his bodily organism. He is fitted like any other animal to a definite range of activity and is psychically adapted to the form of consciousness of reality which his actions require. It is not by reflective thought that he knows he cannot fly like a bird or swim like a fish; it is not by experience that he learns that the ground on which he walks is opaque and solid, that the atmosphere he breathes is transparent and ungraspable, that the blue vault of heaven is above him, that the sun moon and stars move daily across the firmament. He is formed by evolution to regard the earth as immobile, the air as ethereal, the firmament as high above him. Were an individual born with a psychical disposition to experience a revolving earth and stationary sun, to feel the motion of the earth's career through space and be aware of its translation, its velocity and acceleration, it is clear that such a one could take no part in human activities; he would be unfitted to survive, notwithstanding that in every material respect an independent onlooker would see nothing to distinguish him from other men, and his fellow-men would acknowledge that what he directly experienced was what they believed to be true. The degree of human intelligence is not the degree in which human natural psychic dispositions are overcome or enhanced or improved; it is the degree to which man is able to dissociate his psychical dispositions from his view of reality, to emancipate himself from the conditions nature has imposed on him, to choose other systems of reference, to construct reality mentally for himself and practically test his theory in actions.

It is in this sense that we can say that intelligence is the measure of human freedom. It is usually assumed that man developed into an intelligent animal by reflecting on his own sense-experience and discovering that the senses are deceptive and must be corrected by reasoning. Before the evolution theory, when it was generally accepted that to account for man's origin we must suppose the workmanship of an omniscient, omnipotent and beneficent creator, various theories of the deceptiveness of the senses were propounded. In the light of the principle of creative evolution the problem is completely transformed. There is no deception. Evolution in forming us has fitted us to our task, has adapted us to the yoke we have to bear and the purpose we are serving, both as individuals of a definite species and as species of a universal active striving. Intelligence is not the lifting of a veil; it is a release from bondage, an enlargement of scope and range of action.

For example, swimming is not natural to a human being, it is acquired, and that is to say it is an art, and acquiring an art is possible only to intelligence. Probably man acquired the art of swimming by practical adaptation long before he discovered theoretically the muscular movements necessary to keep the head above water and free for respiration. Swimming is not instinctive. Whoever would swim must learn the mode, and unless he has learnt it the instinctive movements which will follow immersion will bring about his destruction. In this we have perhaps the simplest example we can find of the liberating character of intelligence. In navigation, however, man acquired a still greater liberation with an enormous expanse of the range of his activity. This art is the pure outcome of intelligence. It may possibly have originated in

man's discovery of the buoyancy of some natural objects serving as rafts, but the art itself was developed by man's intelligence step by step, and every advance marked an increase of freedom. This art of navigation has in our own time been successfully extended to the air, the element which has always seemed the most intractable to human control, and this extension of human freedom is most instructive. Aerial navigation is not due to an accidental discovery. It has been worked out theoretically step by step and every experiment has been to test a theory. It is the singular instance of a practical development of pure intellection.

What, then, is the nature of the freedom which intellect confers on man? Human freedom is not what the old philosophy described as the liberty of indifference, that is, the exercise of choice by a will undetermined by motives. Nor is it what has been variously intended by the objective images of chaos, chance, or the idea of a tychistic world. It is the basal idea which underlies the concept of active invention and new creation. It is what is essential in the concept of activity when we distinguish activity from mechanical, externally conditioned movement. It is the character we ascribe to activity when we conceive it as inwardly originated in idea, outwardly directed in action, and externally expressed in object or thing. Every living creature is conceived by us as free in this sense, and it is this freedom which distinguishes the living from the inert. Such freedom admits of degree, and the degree is measured by intelligence. It is the degree of this intellectual freedom which from the standpoint of evolution constitutes the privilege of humanity and enables man to assert an overlordship. Intellect does not free man from his humanity, it does not clear his vision giving him insight into the world of truth. The

intelligible world, like the sensible world, is a human world. It has no claim to exist absolutely, and this is proved by the fact that all ideas depend on sense imagery for expression. It is not by taking us out of the sensible that intellect frees us from bondage to sense. It is the extent to which in man this intellectual mode has superseded the instinctive mode, and the measure in which his body has been adapted to a reflective self-consciousness, which justifies us in asserting his position as the highest attainment in the line of animal evolution. A strange phenomenon is this artificial life of man superposed upon his natural life! There is nothing comparable with it among the myriad forms of animal life in which the mysterious force of a creative evolution has found expression. By nature a specific modification of a general mammalian type, comparatively weak and defenseless, organised to maintain a constant blood temperature under varying climatic conditions, dependent on a supply of food, requiring every few hours to replenish the waste involved in continuous living activity, obliged to spend a third of each day in unconscious repose in order to restore organic fatigue, helpless in infancy, virile and self-assertive at maturity, instinctively seeking a mate at adolescence for the sexual function of reproduction, decaying with age, failing and finally dying, man as he emerges in the evolutionary genealogical tree appears peculiarly unfitted for the destiny awaiting him. So far from suggesting by his form and aspect coming lordship and world-wide supremacy he would rather seem, like an anthropoid ape, to be restricted to a peculiarly narrow and very limited region of the earth, and to be able to maintain but a very precarious hold thereon. The nearest relatives to man—the gorilla, the chimpanzee, the orang-utan, the gibbon—have never ranged widely

as man has, nor have they exercised domination. Each species appears to have been evolved in, and adapted to, the special conditions of its habitat. Man on his emergence must have been fitted by evolution to a very restricted environment, and like every other animal form he must have been psychically disposed by powerful instincts to remain within the habitat to which he was peculiarly adapted. There is no evidence and no reason to suppose that this new animal was strangely endowed with a "roving disposition." It is true that the disturbance of nature's equilibrium by the sudden expansion of a species, and the consequent driving out or supersession of other species, is a phenomenon common enough in the geological record and abundantly illustrated in the fauna and flora of the present day. The sabre-toothed tiger of the Pleistocene was contemporaneous with man; finding favorable conditions it spread widely and then became comparatively rapidly extinct, apparently because the deadly destructiveness of its upper canine teeth brought about the exhaustion of its food supply. In our own times, setting aside the disturbances due to the spread of animal and vegetable parasites, we have cases like the rabbit problem in Australia, cases like the supplanting of the black rat by the brown rat, and the latest example of the effect of introducing an animal to a new environment in the supplanting of our common red squirrel by the gray squirrel. In none of these is there the slightest analogy to the human phenomenon. The brown rat did not meet an enemy in the black rat and worst it, nor has the gray squirrel fought and conquered the red variety. In each case the one has supplanted the other by dispossessing it of its food and sheltering places. The weaker is being starved out by the failure of its food due to its consumption by the stronger. There is no

instance of active initiation. In man, on the contrary, so far as all the evidence goes, dispersion and world domination have come not from without, but from within, by invention and new creation, initiated by deliberation and self-reflection. Man by self-conscious reflection has discovered the means to live and work under conditions for which he is not fitted by his natural organisation. He is the only creature who superposes an artificial life on his animality and, so far as the geological records are negative evidence, he is the first creature to have done so.

What, then, constitutes the uniqueness of the human phenomenon? It is that in man alone of all the forms of living organisation freedom is directed to invention and new creation. If perception is implied in our concept of living activity, that is, if we give to the term perception the general significance which Leibniz indicated when he employed it to express monadic activity and distinguished only between the degree of confusion or distinctness in the perceptions of the monads, ranking the monads according to the order of clearness of perception, then we may say that in man we meet with a difference which is no longer one of degree, but of kind. Reason is self-reflective perception. (Leibniz's apperception). The living world presents to us an order of ascending progressive organisation of individual activities. We seem able to read the history of life as the evolution of ever more complex forms of activity from the simpler. But there is no ascending scale of rational activity of intelligence from lower forms to the human. With reason in man evolution opens a completely new chapter. Reason in man does not mean that man's mind is set free from dependence on his body. Man has not suddenly emerged into a realm of absolute truth, hidden from the creatures to

whom he owes his descent. Man's reason is as dependent on man's brain as is the most purely animal instinct. Man's world, the universe he looks out upon and within which he acts, is a human world. The external world is determined for man, as it is for every kind of living creature, both in content and in form, by his organisation for receptive stimulation and responsive action. Human freedom is not escape from animality to spirituality. What evolution has accomplished in man is an adaptation which, by a power of ideal detachment, that is, a power of separating sign from thing signified, has enlarged his range of action and extended his sphere of activity. It is freedom, therefore, in this definite meaning of detachment—implying hesitation, reflection, and deliberation in carrying out nature-prompted external actions—which has given man his supremacy and constituted him a political, ethical and religious being in his social relations.

CHAPTER XI

THE PROBLEM OF EVIL

Tout est bien, sortant des mains de l'Auteur des choses, tout dégénère entre les mains de l'homme. Il force une terre à nourrir les productions d'une autre, un arbre à porter les fruits d'un autre; il mêle et confond les climats, les éléments, les saisons; il mutile son chien, son cheval, son esclave; il bouleverse tout, il défigure tout, il aime la difformité, les monstres; il ne veut rien tel que l'a fait la nature, pas même l'homme; il le faut dresser pour lui, comme un cheval de manège; il le faut contourner à sa mode, comme un arbre de son jardin.

ROUSSEAU.

The old philosophy regarded the relation between physical evil or pain, and moral evil or sin, as direct and self-evident and theology found it impossible to admit a doubt. To question it was to impugn the perfection of the attribute of goodness to God. Pain was essentially punishment, physical pain being the natural punishment for the breach of a natural law, mental pain, sorrow or remorse, the punishment for the breach of a moral obligation. The two forms of evil, pain or physical suffering, anguish or mental suffering, were bound together inextricably in moral theory. The problem of evil was mainly concerned to discover a justification, or rational interpretation, of the obvious *prima facie* injustice in the fact that the wicked prosper and the righteous suffer; and still more, of the serious difficulty that the individual who has to suffer, who must endure the punitive pain or sorrow, is rarely the individual transgressor. Christian theology sought the solution of the fundamental problem of the exist-

ence of pain and suffering in the myth of man's original state of innocence, and the curse incurred by the disobedience of our first parents; yet even so it was necessary to assign particular calamities to particular defalcations. "The parents have eaten sour grapes and the children's teeth are set on edge." "Who did sin, this man or his parents, that he was born blind?" "Or those eighteen upon whom the tower in Siloam fell and slew them, think ye that they were sinners above all men that dwelt in Jerusalem?" Problems such as these tormented the human spirit in the pre-evolution period. There was, moreover, the further difficulty that the lower animals are certainly subject to physical evil, although in no sense responsible for moral transgression. This indeed proved a serious stumbling-block to the theological interpretation, yet until the theory of evolution there was no rational explanation of the suffering of animals (if, which many were driven to doubt, they do suffer pain), and it was relegated to the inscrutable mysteries of Providence. It was impossible to conceive pain as non-disciplinary and as matter of fact the idea that pain is essentially retribution entered into every pre-evolution theory, whether or not it found expression in mythical form.

The evolution principle has not merely transformed the problem of evil; it has deprived it of its ground. It has replaced the fundamental concept of retribution with the concept of pain as economic value. It may be as difficult as ever to assign the particular functional value to a particular organic pain-structure, but to the physiologist and psychologist it is impossible to doubt that pain is a vital product as specific as sight, hearing or touch, and like these sensations to be judged by its utility. The life principle is not a god who commands and who devises retribution as the punishment of dis-

obedience. Evolution is the expression of the activity of life in maintaining specific forms of individual action, preserving by organic responses the equilibrium of a continuous process, meeting the changes of the environment by continual adjustment. Pain is not punitive; it is a form of consciousness with distinctive quality and positive value. It is a mode of sentience contrived for an economic function and having a distinctly utilitarian end. The mystery of pain for the evolutionist is not to discover why it exists, but only to interpret its economic value in particular cases.

One of the first exercises set to students in the modern psychological laboratory is the exploration of the skin to discriminate and map out the sensitive spots which give responses in sensation to stimulation. Over the whole surface of the body it has been discovered that there are terminal neurological organs beneath the outer cuticle which when stimulated, produce sensations, of four differently qualified kinds. They are named the heat, cold, touch and pain spots. To experience pain it is not necessary that there should be actual or prospective injury to the organism; there is only pain when the particular sensory nerve-ending is responding to stimulation. This discovery that pain is a specific sensation with a specific sense quality, ultimate and unanalysable, the direct result in consciousness of the stimulation of a definite sensory receptive nerve terminal, is of the highest significance. Qualitatively pain is as ultimate an element in experience as is any specific sensation of smell, taste, vision or sound. It cannot be defined in terms other than itself. It can be referred to, but it cannot be described. It plays a positive part in the sensori-motor system. If a pin be drawn lightly over the skin it evokes a touch sensation which may be informative; if it be pressed down it

evokes immediately a pain sensation, which initiates a reflex action and causes the immediate retraction of the affected part. When a man walks barefoot, the sole is sensitive to the surface of the ground and adapts itself automatically, but if a pain spot is stimulated by treading on a sharp stone, the foot is retracted instantaneously. Pain spots are unequally distributed. In some parts of the body, as in the cheeks, they are almost absent; in the delicate conjunctiva of the eye, on the other hand, they are the only form of sensitiveness. The significance is clear. Pain is a biological factor with a distinct psychical function. It is not superposed or inflicted. It is not a name for discomfort or consciousness of injury, or general disorder. It is not disciplinary. It enters as a specific and positive element into the psycho-physiological scheme of living activity.

Were the difference between the theological doctrine of pain and its interpretation in the light of the scientific principle of evolution merely a question of the truth or error of a theory, it would be of comparatively little importance. In its practical aspect, however, the theory that pain is evil, that its purpose is punitive, that in the natural order it occurs as retribution for the transgression of nature's laws, and in the moral order subserves the disciplinary rule of the divine creator, is tragic in the desolating influence it has exercised. It is doubtful whether in the whole of human history any idea has been so fateful, so dire in its effect on human social development, as the idea that pain is retribution. Not merely has it been unfortunate theoretically in its purely negative effect, that is, in deflecting science from its ameliorating work, but in its positive aspect and practical application it is responsible for widespread and wholesale misery. It is only necessary to remind

ourselves how the idea that plague and pestilence and contagious disease are divinely appointed scourges to punish transgression is hindering applied science even in the comparatively emancipated opinion of intellectual races to-day.

In the poem of Lucretius the indictment of religion as the grand cause of human misery is set forth in burning words:

> Religio peperit scelerosa atque impia facta.

Oppressing the imagination of the ancient world was the terrible scene which to the Greeks had the authority of religion, the sacrifice of Iphigenia:

> Nam sublata virum manibus tremibundaque ad aras
> Deductast, non ut solemni more sacrorum
> Perfecto posset claro comitari Hymenaeo,
> Sed casta inceste nubendi tempore in ipso
> Hostia concideret mactatu maesta parentis,
> Exitus ut classi felix faustusque daretur.
> Tantum religio potuit suadere malorum.[1]

The two ideas which underlie religion, the first that the world is sustained and over-ruled by a rational

[1] The whole passage of Lucretius, *De Rerum Natura* I, 84-101, is rendered as follows in Munro's translation:

"Thus in Aulis the chosen chieftains of the Danai, foremost of men, foully polluted with Iphianassa's blood the altar of the Trivian maid. Soon as the fillet encircling her maiden tresses shed itself in equal lengths adown each cheek, and soon as she saw her father standing sorrowful before the altars and beside him the ministering priests hiding the knife and her countrymen at sight of her shedding tears, speechless in terror she dropped down on her knees and sank to the ground. Nor aught in such a moment could it avail the luckless girl that she had first bestowed the name of father on the king. For lifted up in the hands of the men she was carried shivering to the altars, not after due performance of the customary rites to be escorted by the clear-ringing bridal song, but in the very season of marriage, stainless maid mid the stain of blood, to fall a sad victim by the sacrificing stroke of a father, that thus a happy and prosperous departure might be granted to the fleet. So great the evils to which religion could prompt!"

agent, the second that evil is retribution, have been so closely interlocked in the history of human thought that it is doubtful if any instance of their dissociation exists. The union of these two ideas is the doctrine of the cross. We may search for its origin in Judaism or in Greek mythology, but it is rooted in the idea that suffering is punitive in its intention, and that pain is an infliction, a penalty for the breach of some law, natural or divine. The great effort of Christian philosophic thought has been to show that pain though evil is negative in its nature, and that its infliction may be justified as good. The consolation which religion offers takes the form, "Whom He loveth, He chasteneth."

It is doubtful if a more sorrowful instance of the calamitous consequences of the religious doctrine could be found than is afforded by the superstitions which in some form in all religions have attached themselves to the travail of women in child-bearing. It is the more terrible and the more worthy of deep reflection because even from the scientific standpoint the pain which accompanies parturition is a mystery of evil. In almost all cases where vital organic processes are accompanied by pain it is possible to point to some direct advantage to the suffering individual. In this case it is impossible to suggest any. Such economic value as we can assign to it scientifically would appear to be racial and not individual. In the case of parturition pain is the invariable accompaniment of a perfectly normal life process. The physiology of reproduction requires that at a certain definite stage of the growth of the fœtus it shall be expelled from the uterus. This expulsion can only be effected by muscular contraction, and contraction of the uterus is accompanied by pain amounting to the crucial degree of agony. It seems non-natural, and it is clearly irrational, that a normal life

process should be painful instead of pleasurable, or at least neutral. It is obvious that were ordinary muscular contraction painful life would be unqualified misery. Pain when it does occur in ordinary muscular contraction is exceptional and always can be traced to discoverable extrinsic affection. In normal, healthy functioning neither the striped fibre in the skeletal muscles nor the contraction of unstriped fibre in the visceral muscles is painful. It appears, therefore, peculiarly mysterious that in the case of parturition the naturally induced contraction should involve not mere discomfort, but positive intense pain.

The principle of evolution enables us to offer a scientific explanation, because in evolution we are able to understand the goal of a life purpose transcending the well-being of individuals. The generations pass. Each in its turn serves by its life to secure the present realisation of the creative activity and provide the vehicle of its realisation in the future. The pleasure-pain principle which is attached to individual experience secures by means of the individual an end which is beyond and indifferent to the well-being or happiness of the individual. The utility of pain from this aspect is not negative—not a preventive or curb to keep the individual in his course—but positive, a direct spur to action. If in the light of this principle we inquire why parturition, a normal stage of a normal physiological process, is painful we can discern a rational answer. Pain secures the physical action which results in safe and rapid delivery at the right moment. Were pain to intervene at any other point in the process it would defeat the end.

In the pre-evolution period such a concept of the economic value of pain was impossible. Confronted with the mystery of the travail of childbirth the imagi-

nation of man could only picture an offended God, and the cause of this anger was set forth in myth, interpreted intellectually, and the means of appeasing it sought for. The myth of the human transgression which brought down the curse on woman is typical of the human tragedy. Man begins by constructing an idol of the imagination and bows down before it and worships it in grovelling humility. The image he has projected takes shape and assumes authority over his mind, is embodied in theological doctrine, tyrannizes over his life and oppresses like a nightmare the minds of the generation which succeed. Think of the poignancy of misery concentrated in those words of the Apostle Paul in the Epistle to Timothy: "Adam was not deceived, but the woman being deceived was in the transgression. Notwithstanding she shall be saved in childbearing, if they continue in faith and charity and holiness with sobriety." Throughout the more than two thousand years of the development of Judaeo-Christian religion man has seen in the travail of women nothing but the curse of God on a transgression. It has been handed down as an article of religious faith that excessive penalty has been imposed on one sex in the functioning of natural, racial reproduction, because the woman yielded to the temptation of the serpent. The poetical myth may stand, may be treasured as a beautiful allegory, be variously interpreted by theologian and philosopher, but who shall measure the oppression of human misery, who shall fathom the depth of pathos in the tragedy which has made the birth of the human individual imply pollution in the suffering mother to be purged away by ceremonial cleansing?

The counterpart of the conception of pain as retribution is the conception of pleasure as reward. In

religious systems the theory was worked out in an elaborate scheme of divine justice, according to which every living soul would be brought before the divine tribunal in judgment and punished with pain or rewarded with pleasure according to whether its deeds were pronounced good or evil. And just as there was a mystery of evil in the fact that the righteous suffer pain, so there was a correlative mystery in the fact that the wicked flourish and that wrong-doing is accompanied by pleasure. There is a scientific error in this conception of pleasure, but it is of a different order to that which we have noticed in regard to the conception of pain.

There are no direct scientific data which enable us at once to assign its real nature to pleasure as there are to prove that pain is a specific sensation. No one yet has claimed to have discovered specific pleasure responses to specific nerve stimulation, no one has discovered pleasure spots analogous to the heat, cold, touch and pain spots. Whether there exist specific pleasure organs or not, it is clear that pleasure does not offer to the biologist the same definite, positive, specific character which attaches to pain. Psychologists are now generally agreed that pleasure-pain is not a true case of logical opposition. The one does not negate the other, for even pain may afford pleasure to the sufferer without losing its painful character. The negation of pleasure is not pain but displeasure or unpleasantness. It is not possible to inflict physical pleasure on another in the way physical pain is inflicted. There are instinctive cravings in man, the gratification of which presents itself as pleasure, but this pleasure of satisfaction is an integral disposition of the mind, and not the specific response to the excitation of a specific organ.

The human experience of pain and the elusive character of pleasure, or even the relative character of the more refined concept of happiness, is not, then, for the evolutionist a mystery of evil, and the evolutionist is not confronted with a moral dilemma in regard to the facts they depend upon. Yet there is a mystery of evil in the fundamental concept of evolution. To describe the active principle of life as itself good or evil, to propound the question, Is life worth living? if by life we mean existence, is indeed unmeaning. The ground of existence must transcend its partial aspects; it cannot call itself up for judgment before a tribunal which depends upon it alone for its authority. The evolutionist who would question the value of life or call on life to justify its works is open to the same retort which the apostle made to the scoffer. "Nay but, O Man, who art thou that repliest against God? Shall the thing formed say to him that formed it, why hast thou made me thus?" Yet there are two mysteries in the concept of life as creative evolution. The first is that living activity implies opposition and conflict; and the second is that, like the god Saturn, evolution devours its own children.

Neither of these mysteries is in the moral sense evil, although each in its way offends both our aesthetic sense and our logical sense of the fitness of things. It is an ugly fact in our natural life that our well-being must depend on the continual sacrifice of forms of individual, living activity, beautiful in themselves and determined in their lives by ideals of their own. Disguise it as I will, it conflicts with my rational ideals that beautiful creatures must be sacrificed to my need of food and comfort. It is also disheartening to reflect on the vanity of life. Try as I will to encourage myself to pursue a life of high purpose, I know in my

heart that it counts for nought in the universal life, that the greatest individual achievement is no more than the flourishing of a leaf on the tree of humanity.

There is, however, a profounder problem. Besides the mysteries of existence and the worth of the individual there is a real problem of evil at the heart of the concept of creative evolution. It is the problem of the dire consequences which spring from the human exercise of the power of imagination. It is expressed in the words of the old myth, "God saw that the wickedness of man was great in the earth, and that every imagination of the thoughts of his heart was only evil continually."

When we consider humanity as a phenomenon of living evolution, there is something characterising man and the human mode of intellectual activity singular in its universality. Man alone of living creatures possesses the power of detachment which enables him to shape idols of the imagination and bow down before them. Under whatever actual condition we meet man, and also under whatever past conditions the geological record enables us to reconstruct his life, we find him making a use of reason which cannot but strike us as essentially irrational. It is so irrational that we have to search in human nature for its explanation. We usually explain it as a corruption of a lost primitive state of innocence, and yet we have no evidence of any actual pristine rationality and no evidence that humanity generally is evolving or advancing towards a pure life of reason. Man is a being with rational ideals, but his life is a life of unreason. If we pass from general reflection to detailed observation we may indicate—it is not without surprise that our attention is drawn to it—that one most universal characteristic of human behaviour as com-

pared with animal behaviour is the practice of mutilation. In highly civilised races this practice survives in the comparatively innocent form of shaving the face, cutting or trimming the hair, paring the nails, various fashions generally excused on the ground of personal cleanliness or adornment, yet it is not wholly so, for in some of the most advanced races ceremonial, organic mutilations such as circumcision survive in all their hideousness. In primitive peoples, however, serious and very painful mutilations are universal. It is characteristic of savage races, that is, of those human beings who approximate most nearly we think to the natural state, that their customs enjoin on individuals the slitting of the nose, the piercing of the ear-lobes, the tattooing of the skin, the removal of hair by uprooting. Man is the only creature which practises self-mutilation. A crab will wrench itself free from its imprisoned claw, a lizard will snap itself off from its captured tail, but these are vital contrivances and have a distinct utility value to the creatures. It is only in fables that foxes propose to cut off their tails, and it is only man who derives aesthetic pleasure from mutilations inflicted on himself and on the animals he domesticates or attaches to himself. This is a singular and also a significant fact. It shows that the first use man makes of his rational nature is not to use it to nurture his body, but to penalise himself. When we search out the origin of this distinctively human characteristic we have no difficulty in tracing it to a psychical source. It arises in the terror which man has engendered in his own imagination. It seems as though evolution in endowing man with the power of detachment which reason implies, and thereby raising him above the beasts of the field, has turned his mind towards self-destruction. Anthropology is a long history of hideous

cruelty-practices by tribes living as near to the primitive conditions of human natural environment as it is possible to get.

Man is a religious animal. Man is the only animal which has evolved codes of behaviour presuming the presence and influence of unseen spiritual forces, and invariably man has conceived those forces as cruel. The gods are naturally blood-thirsty. Even the protests raised by religious innovators, preachers of gospels of peace and goodwill, the Christ and the Buddha, illustrate the same natural tendency. Both those preachers of peace had to set themselves against the intolerant cruelty of the human imagination and were powerless in their influence to prevent the religions they founded from developing the same persecuting spirit.

An historical analogy throws a lurid but most instructive light on the terrible tyranny which the human imagination wields over human destiny. In the old world there are two buried civilisations the complete records of which we seem to be recovering—Mesopotamia and Egypt. In each of these countries, owing to their peculiar position, great empires seem to have arisen at a period when all the surrounding countries were peopled by nomad tribes or loosely organised small agricultural communities. In each of these great empires there arose state religions, and in each case we find those religions were conducted with the cruellest rites. The religious institutions of these empires present themselves to us as a very orgy of cruelty, not of a brutally minded race, but of a people tyrannised over by their own imagination. In Babylonia we have a worship of Gods who are only appeased by human sacrifices. In Egypt we have a wealth of ritual concerned with the idea of life after death. So powerful is the

hold of this tyranny that it may be said never to have passed away, but to have been handed on as an inheritance when the empires perished and were succeeded by other civilisations.

There is a still more significant fact. When the Spanish explorers discovered the new world in the fifteenth century they found it peopled by races of mankind which had no known connections with the races of the old world, and which in any case must have developed their civilisations during untold ages in complete independence. Yet there was an exactly corresponding development of religious ideas in the new world as there had been in the old. In America there had arisen, on the plains of Mexico and on the lofty plateau of the Andes, two independent empires, recalling in a remarkable way the civilisations of Mesopotamia and Egypt, and corresponding almost point to point in their religious institutions. In Mexico the conquerors found established an elaborate ceremonial religion, hallowing practices of the most revolting and hideous cruelty. In Peru they found a cult of the dead imposing the most ghastly sacrifice and suffering on the living. We search in vain for any ground or justification in reason, or for any material, moral, or spiritual consolation. Gladly would we welcome any theory which would persuade us there had been a false step or an unnatural development. There is no consoling theory. All we can say is that human history bears witness to the tyranny of the imagination, and yet it is the imagination which beyond every other achievement marks man's elevation in the animal scale. Imagination has given man the beatific vision, has freed him from bondage to the present, but also it has filled the unseen world with terrors. We may apply to this aspect of human nature the wonderful words of

Rousseau, "Man is born free, he is everywhere in chains."

It is not difficult to trace this evil to its root. It lies in the obvious contrast between man's consciousness of his freedom as an individual within the narrow range of his individual activity and his consciousness of inscrutable and overwhelming power which, whether blindly or purposely, has determined the condition of his freedom and its range. What difference ought it to make that we are able to advance from a concept of this universal power, based on the terrifying image of an angry god, fashioned by an untutored imagination, to the rationally deduced concept of creative evolution? Have we in this rational achievement the means, if not of salvation, at least of amelioration?

CHAPTER XII

POETS AND PHILOSOPHERS

Bring me my bow of burning gold!
Bring me my arrows of desire!
Bring me my spear! O clouds unfold!
Bring me my chariot of fire!

I will not cease from mental fight;
Nor shall my sword sleep in my hand
Till we have built Jerusalem
In England's green and pleasant land.

—BLAKE.

In all our valuations—moral, aesthetic, economical, religious—we distinguish between means and end, and we bring a different criterion to the consideration of the two valuations. The means is for the sake of the end, while the end always shines by its own effulgence. It is we who make the distinction; in vain do we look for it in the reality itself. The rose and the lily which give us such exquisite aesthetic pleasure are no more than stages in the life process of plants and have no special privilege in their life history. The other stages and their manifestations—seed, germination, formation of roots, stem and leaves, whatever in fact is involved in the process of plant life—are not for the sake of the flowers. It is we who, by reason of our interest look on the flower or fruit as the value, endow these with beauty and utility in their own right, and consider them as the end to which all else is the means.

Hume, in the opening section of his *Enquiry Concerning Human Understanding,* remarks, in his genial

way, that moral philosophy may be treated after two different manners. The one he describes as the easy and obvious philosophy, the other as the accurate and abstruse. Each, he is anxious to impress on us, has its peculiar merit and may contribute to the entertainment, instruction and reformation of mankind. The easy way is that which selects objects for their value, "alluring us into the paths of virtue by the views of glory and happiness."

The distinction is perhaps profounder than even Hume realised. It is the difference between our view of the world when we seek to see it as we suppose God sees it, that is, as it would appear in its universality with no part of its existence contingent, no part relatively insignificant, and with no degrees of dignity, and our view of the world when we appraise it by the standards of our human valuations. To obtain the first kind of view is the ideal of science and to philosophy it is the theoretical interest. Theory is the basis of practice. Practical activity presupposes theoretical, knowing is the condition of acting and not, as sometimes appears, its conditionate.

It is important, then, to recognise that, if in accord with the principle of evolution we identify God with the living impulse, we are committed to a work of deanthropomorphisation. For creative evolution human valuations are meaningless. The God of creative evolution is not the God who loves Jacob and hates Esau, the God who hardens Pharaoh's heart and leads his chosen people out of Egypt to invade the promised land, to destroy the Canaanites and possess their heritage. In other words we cannot regard man as the goal or final end of evolution, and the human form and mode of activity as the successful outcome of the age-long process. The world in its actualisation is always

complete. No unfinished task confronts a purposive intelligence, no ideal plan exists in advance of a material actualisation, and all actualisation is new creation going forwards.

Yet the aspect of the cosmos to the philosopher who regards it with a practical or ethical interest, who asks himself how he is to behave in it, how he is to conduct himself so as to realise the good life, is of necessity totally different from the aspect it assumes to the scientific student whose ideal is the complete suppression of personal interest, the complete abstraction from privilege or value, the pure synoptic contemplation of reality in its theoretical itselfness. If the world itself assume to such a contemplator the aspect of value, this value is always conceived as dependent on and conditioned by existence. This is the great illusion. Philosophy shows us that the world of values is not a world superposed on a world of existence without value; it is the existing world in its aspect of human experience.

Ethical philosophers whether of the ancient or modern period, almost if not entirely without exception, have associated this value aspect of the cosmos for man with the human rational mode of logical discursive thinking, that is, with the faculty of reason. A few have distinguished between aesthetic values on the one hand and ethical and religious values on the other, and have based the aesthetic values not on reason, but on imagination. All without exception have based ethical and religious values on reason. And when philosophers have been drawn to the study of the activity of the imagination it has been almost always with a view to purifying the stream of reasoning from the pollution of imagination and its muddying disturbance. In contemporary philosophy all this

is changed. One of the characteristic features of philosophy to-day is the recognition of the imagination as an aesthetic faculty and its distinction from the intellect as a logic faculty. This new aesthetic doctrine has in its way revolutionised the science and philosophy of the human mind. Instead of regarding the imagination as a riotous and chaotic and undisciplined nature, bursting into and overflowing the clear orderly flow of the logical enlightenment of discursive reason, we are now able to assign to imagination its rightful place as the primordial mental activity, and to study its expression as the first form in which man comes into the possession of knowledge. Man is primarily an imaginative being, possessing and exercising a fantastic faculty, and his conscious activity is essentially aesthetic. He creates images, and in this way his intuitions find expression. His logical activity depends on this aesthetic production, and not *vice versa*. Reason manifests itself not as enlightenment, but as an integrating, regulating, co-ordinating and controlling power over the imagination.

This new orientation of the study of man has important bearing on the anthropological sciences. We are no longer under the necessity of ascribing the religion of primitive peoples to logical reasoning, and their superstitions and taboos and revolting ceremonials to a degraded nature, and we have no longer to devise theories of original sin in order to explain non-rational behaviour. It is inconceivable that natural man by pure abstract reasoning could acquire a natural religion. On the other hand it is in the very nature of the imagination to endow its creations with independent existence and power, to fashion idols and fall down before them.

Since Plato proposed to banish poets from his

Republic there has always seemed to be a natural enmity between sense and understanding, between beauty and truth, between art and philosophy, between the things of the world and the things of the spirit. It is not only in religion that a Kingdom of Heaven has separated itself from a kingdom of this world, that the elect are enjoined to put off the old man, to eschew the world and the flesh, to turn their backs on Satan and embrace the ideal of the spiritual life. In science and in philosophy there is the same opposition. There is a hierarchy in science which assigns to the intellect a higher dignity than the senses possess, and to reason a dignity higher than the intellect. Logic and mathematics, the sciences which deal with truths of reason, occupy a higher plane than the natural sciences which deal with matters of fact, and these natural sciences have beneath them the wild tumultuous disorder and confusion of common-sense experience.

Plato's indictment of the poets is a protest against the employment of the sensuous imagination in creating the objects of religious worship and in characterising the gods with the frailties of human personality. But Plato, as we know, regarded the world of sense and imagination as a descent from the intellectual world, a gross kind of imitation of the pure forms, a deceptive world of shadows, an obscuration of the ideas. To Plato, therefore, it was a profanation of religion to humanise the gods and to sensualise the intellectual life. Curiously enough we seem to have the very opposite of this conception in Christianity, in the doctrine of God made flesh. It is only seeming, however. The incarnation is indeed the doctrine of the divine condescension, "he did not abhor the virgin's womb," and the purpose of this descent is to raise man's sinful and corruptible body to a pure and

incorruptible body. God descends that man may rise, and redemption from the sense world is the purpose of the whole scheme. What Plato failed to see, and equally what Christian philosophy failed to see, is the essential and necessary work which the human imagination itself must accomplish before the purifying work of the intellect can begin. For the true discernment of this essential relation between the imagination and the intellect we have to come to modern thought, and in modern thought it is a late development.

The clue to the modern conception of the primacy of the imagination in the mental life, the recognition that an aesthetic activity creating sensuous imagery is the prerequisite of a logical activity constructing a conceptual world, may be traced to a notable discovery of Immanuel Kant, a discovery which he tells us illuminated for him the whole problem of the relation of mind to nature, and suggested the transcendental theory. It has proved to be the starting point of a new progressive development of constructive thought. Kant's discovery was that mathematical judgments are synthetical and not, as until then had always been taken for granted, analytical. Had David Hume, says Kant in the *Prolegomena,* seen that not only the judgment of causal connection, the idea of a necessary connection between matters of facts, but also mathematical judgments which affirm a necessary connection between truths of reason, are synthetical, it must have altered the whole direction of his speculative inquiry. Every student of the *Critique of Pure Reason* knows the important argument which Kant bases on the critical examination of the judgment, $7 + 5 = 12$. This is not, Kant insists, merely an analytical judgment, deduced from the concept of the sum of seven and five, according to the logical law of contradiction. The

concept of the sum contains only the union of the two numbers in the single number, and by thinking the union of the numbers seven and five we do not think twelve. To get the concept twelve we must go beyond the union of the two numbers by calling to our aid intuition or, as we should say, imagination, that is, we must have some sensible image such as our five fingers, or five points, and add the units successively. Unless we call in aid this sense intuition we can never by dissection find the sum.[1]

The same fact is even more obvious, Kant shows us, in geometrical judgments. That the straight line between two points is the shortest is a synthetical proposition. The concept straight line is the concept of a quality and contains no judgment of magnitude. Intuition must be called to our assistance, intuition, not in the meaning of external perception in which the mind is passive but in the meaning of the active creation of a sense image. In this Kant is really calling attention to a fact which is universal in all the concepts of mathematics, physics and nature. The concepts of the ultimate factors in physics, for example, the electrons and protons and electro-magnetic fields, are constructed mathematically and consist of qualities which are below the range of sense perception, yet they can only be stated or conceived by calling in aid sense imagery.

We may see in the development of Kant's philosophy through his three great Critiques the growing importance of the principle he has discovered. We see it in the *Critique of Pure Reason* in the doctrine of

[1] "Man muss über diese Begriffe hinausgehen, indem man die Anschauung zu Hülfe nimmt. . . . Wir möchten unsern Begriff drehen und wenden, wie wir wollen, wir, ohne die Anschauung zu Hülfe zu nehmen, die Summe niemals finden könnten."

space and time. The manifold of sense must receive aesthetic form in order that the world of outer and inner experience may be perceived. Imagination must do its productive and schematic work in order that the outer world may supply the content of knowledge in a form which the categories of understanding can receive it. It is, however, in the *Critique of Judgment*, in which the judgment of taste and the teleological judgment, with their values of beauty and sublimity, are criticised, that Kant's conception of the important part played in knowledge by aesthetic creation is expressed.

My concern here, however, is with religion and its relation to philosophy. Without the work of the imagination religion, if we suppose it to exist in the human mind, would be without any concrete expression, and however purified from sensuous imagery the concepts of religion may become they are absolutely dependent on the aesthetic activity for their content. This means that we owe our religion to the poets and not to the philosophers, however necessary for its healthy expression the cathartic function of philosophy may be.

No more concrete and convincing demonstration of this fact exists than that which is offered to us in the history of Christianity as it is unfolded in the gospels and epistles of the New Testament. In regard to this all students of the origin of Christianity can agree, whatever view our racial development, our cultural environment, or our individual scholarship may lead us to adopt of the value of the teaching of Jesus and Paul as evidence of a divine revelation. In the founder of Christianity, Jesus of Nazareth, we have a poet in the literal and in the fullest meaning of the term. He created the aesthetic vision of the Kingdom of

Heaven. It was a Messianic image and its material was furnished by the Hebrew Scriptures, yet it was his vision, the vision of a kingdom of righteousness to be established by the almighty power of God, without other weapons than those of lowly and contrite hearts, and despite the brutal power of the Roman Empire and the material glory and authority of the kingdoms of this world. Not only did Jesus give concrete shape to his vision in his life and teaching, but it moulded his mind and determined his deeds even to its apparent disastrous failure in his death on the cross. So forceful was it that his disciples and followers could extol and glorify its success in the very moment of visible defeat and carry it forward to unforeseen and unimagined realisation. No more amazing instance of the power of pure aesthetic creative imagination exists. It has been said, however, and with undeniable force, that the true founder of Christianity was Saul of Tarsus. It is just this fact, that the origin of Christianity is twofold, which illustrates so effectively the spiritual truth that religion depends on the work of the poet and of the philosopher. Without the poetical creation of Jesus the philosophical work of the Apostle Paul would be empty. Jesus provided the imaginative substance, the poetical imagery, to which Paul gave the expression of rational form. Form without content or content without form are unreal abstractions. Paul is the philosopher of the new dispensation, Jesus of Nazareth the poet.

This is an illustration only, but the philosophical reflection to which it leads is profound. What is the future of religion, if we accept, as surely in some sense we must all accept, the philosophy of evolution? Religion is a need of humanity. Science cannot take

its place. The expression "religion of science" is a misnomer and conceals an inherent contradiction. Science in the very conception of it is abstract and logical; religion is concrete and philosophical. To realise the need of religion we have only to bring to mind the horror of darkness which seemed for a moment to settle on the human outlook when the materialistic science of last century threatened the extinction of all hope of discovering spiritual values. Now it seems that humanity is called upon to make a new valuation. The great concept of evolution, and the particular application of it to the story of our human origin, have altered completely the whole perspective of the world problem. There has come to pass in our generation what has more than once occurred before in the short historical period covered by the human continuous historical record, a sudden widening of the intellectual horizon, a new scientific conquest, a vast expansion or outward push of the cosmic environment making the old religious conceptions inadequate. The imagery which once sufficed to overwhelm and awe the human mind has become childish, fanciful and even grotesque. We can no more picture the unseen world of spiritual reality in the imagery of what but yesterday were accepted symbols of religion, than we can believe in the cosmogonies of Dante or Homer. Milton, Wordsworth, Tennyson, Browning are all left behind. The discoveries in science since the present century opened have made our world shrink into such mean proportions that what is whispered in one hemisphere is immediately heard and responded to in another, and have made the infinities above and below us which formerly overawed the imagination so manageable that we can speak familiarly of light-years and Angstroem units. It is as ridiculous in such a world to

console mankind with a vision of apocalyptic glories as to seek to discipline it with terrific denunciations of coming judgment.

Let us take stock of our true position. Evolution has brought into existence a kingdom of man. Man the outcome of the ages, the transient possessor of a vast heritage, finds himself—how he knows not—why he knows not—awakened to the consciousness that his destiny is somehow placed in his own hands. The old myth of his creation has suddenly assumed for him an entirely new significance. If we substitute for the anthropomorphically imagined Lord God, planting a garden in Eden and instructing his new-made creature in his duties and privileges, the new idea of the living activity, the push of life, which has evolved for itself in its continual creation of new forms a species of higher order in which its creative power may be actualised, and to this new form has entrusted the power of determining its own fate by freeing it from its immediate dependence on its environment, we may still find in the language of the old myth the exact expression of the new science. An active, living force has given man lordship, has given man the choice to eat of the tree of life, *carpere diem,* or to eat of the tree of knowledge of good and evil with its fatal consequences. The choice has been made. Man has eaten the forbidden fruit and his eyes have been opened. And now he finds his fate in a peculiar sense is in his own hands. He can turn his knowledge to self-destruction, or he can work for a kingdom of man. In either case he must reckon with God, not indeed with a God in his own image, a God who is no more than the fearful projection of his own being against a confused and undiscriminated background, but with the God from whom he derives his being, the ceaseless creative activ-

ity which has actualised him, which is ever working in him and through him and beyond him.

What, then, is the religious ideal which the evolution theory offers us? It is the ideal of a perfected humanity. How are we to envisage it, and how are we to actualise it? We turn for light to the philosophical conception of our human mental activity. It expresses itself in manifold forms, but in the depths of human nature a profound, twofold division of spiritual activity appears, a creative imagination and a creative reason. In living individuals this activity finds varying expression, making of our leaders poets and philosophers. If the ideal of humanity is ever realised, it will be when poets have created the new Jerusalem and when philosophers are kings.

INDEX

Atomic Theory, 113

Bacon's *New Atlantis*, 127
Bergson's Argument for personal survival, 165
Illustration of dissolving sugar, 12
Berkeley's, Idealism, 30
Illustration of Fountain, 30

Carbon, Its relation to life, 37
Child-birth, Cruelty of superstitions regarding, 201
Copernicus, *De Revolutionibus Arbium Celestium*, 21

Daniel's *Voyage du Monde de Descartes*, 108
Darwin's Mechanism, 144
Descartes' Cosmological Theory, 22
Dualism of Mind and Body, 58
Illustration of the Beeswax, 11
Indestructibility of movement, 23
Necessary truths dependent on God's will, 5
Opinion that animals are automata, 50
View of Instinct, 143
Vortex theory, 51

Einstein, 117
Ether, Its relation to matter, 166
Evolution, Cosmical contrasted with biological, 38
Relation to Monadic theory, 126

Freedom, the goal of Evolution, 99

Gassendi's Epicureanism, 22

Herodotus's Story of the Nile dwellers, 32
Hume's *Enquiry concerning Human Understanding*, 122, 211

Immortality, The Platonic Theory, 158
The Resurrection Theory, 159
The Monadic Theory, 162
Instinct and Intelligence, 139
Integrative Function of the Brain, 134
Intelligence Tests, 139

Kant on the Moral law, 89
on the ontological argument, 73
on the synthetic nature of mathematics, 216

Laplace's Reply to Napoleon, 177
Leibniz Answer to Locke, 40
Distinction between Intellect and Will, 5
New System, 27
Locke's Theory that the brain thinks, 40, 137
Lodge, Sir Oliver, Survival Theory, 165

Lucretius, 200

Malebranche, 24
Maxwell's Demon, 35
Michelson - Morley Experiment, 69
Montaigne, 130

Newton's Cosmology, 26

Ontological Argument, 71

Pain, The Mystery of, 198
Parable of the Sower, 102
Pascal's Puy de Dôme experiment, 26
Scapula, 71
Personality, the nature of, 167
the disorders of, 171
Positivism, 121
Principle of Relativity, 117, 132
Psycho-physical Parallelism, 122

Quantum Theory, 154

Rorarius, Bayle's Dictionary Article, 140

Spencer's *Data of Ethics,* 91
Spectroscope, 115
Spinoza's Cosmology, 24
Intellectual Love of God, 105
Rejection of Dualism, 17
Survival, The Biological Argument, 169
The Physical Argument, 165
Swift's *Gulliver's Travels,* 175

Torricelli's Barometer, 25.

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